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Table 2-3
Reporting Limits and Regulatory Criteria for Soil

Analyte (and Analytical Method)	REPORTING LIMITS		REGULATORY CRITERIA
	Target Quantitation Limit ^a (mg/kg)	Method Detection Limit ^b (mg/kg)	Residential Soil PRGs ^c (mg/kg)
VOCs (U.S. EPA Methods 5035A and 8260B)			
acetone	0.1	0.0028	1,600
benzene	0.005	0.00063	0.6
bromobenzene	0.005	0.00076	28
bromochloromethane	0.005	0.00081	NL
bromodichloromethane	0.005	0.0007	0.82
bromoform	0.005	0.0008	62
bromomethane	0.01	0.0016	3.9
2-butanone	0.1	0.00071	7,300
n-butylbenzene	0.02	0.00052	240
sec-butylbenzene	0.02	0.00093	220
tert-butylbenzene	0.02	0.00045	390
carbon disulfide	0.1	0.00108	360
carbon tetrachloride	0.005	0.0008	0.25
chlorobenzene	0.005	0.0005	150
chloroethane	0.005	0.00155	3.0
chloroform	0.005	0.00143	0.94 ^d
chloromethane	0.01	0.00182	1.2
2-chlorotoluene	0.02	0.00099	160
4-chlorotoluene	0.02	0.00105	NL
dibromochloromethane	0.005	0.00085	1.1
1,2-dibromo-3-chloropropane	0.02^e	0.00219	0.019^{d,e}
dibromomethane	0.005	0.00065	67
1,2-dibromoethane	0.02^e	0.00141	0.0069^e
1,2-dichlorobenzene	0.005	0.00046	370
1,3-dichlorobenzene	0.005	0.00067	16
1,4-dichlorobenzene	0.005	0.00067	3.4
dichlorodifluoromethane	0.01	0.00083	94
1,1-dichloroethane	0.005	0.00034	2.8 ^d
1,2-dichloroethane	0.005	0.00014	0.28 ^d
1,1-dichloroethylene	0.005	0.00076	120
cis-1,2-dichloroethene	0.005	0.0022	43
trans-1,2-dichloroethene	0.005	0.0034	69
1,2-dichloropropane	0.005	0.00062	0.34

Table 2-3 (continued)

Analyte (and Analytical Method)	REPORTING LIMITS		REGULATORY CRITERIA
	Target Quantitation Limit ^a (mg/kg)	Method Detection Limit ^b (mg/kg)	Residential Soil PRGs ^c (mg/kg)
VOCs (U.S. EPA Methods 5035A and 8260B) (cont.)			
1,3-dichloropropane	0.005	0.00065	NL
2,2-dichloropropane	0.005	0.00067	NL
1,1-dichloropropene	0.005	0.00055	NL
cis-1,3-dichloropropene	0.005	0.00047	NL
trans-1,3-dichloropropene	0.005	0.00043	NL
ethylbenzene	0.02	0.00064	8.9
hexachlorobutadiene	0.05	0.00060	6.2
2-hexanone	0.02	0.00016	NL
isopropylbenzene	0.02	0.00111	570
4-isopropyltoluene	0.005	0.00045	NL
methylene chloride	0.05	0.00458	9.1
4-methyl-2-pentanone	0.02	0.00093	790
naphthalene	0.02	0.00041	56
n-propylbenzene	0.005	0.00042	240
styrene	0.005	0.00069	1,700
1,1,1,2-tetrachloroethane	0.005	0.0006	3.2
1,1,2,2-tetrachloroethane	0.005	0.0012	0.41
tetrachloroethene	0.005	0.00054	1.5
toluene	0.005	0.00065	520
1,2,3-trichlorobenzene	0.02	0.00028	NL
1,2,4-trichlorobenzene	0.02	0.00052	650
1,1,1-trichloroethane	0.005	0.0004	1,200
1,1,2-trichloroethane	0.005	0.00027	0.73
trichloroethene	0.005	0.00094	0.053
trichlorofluoromethane	0.01	0.00126	390
1,2,3-trichloropropane	0.02 ^e	0.00124	0.005 ^e
1,2,4-trimethylbenzene	0.02	0.00118	52
1,3,5-trimethylbenzene	0.02	0.00097	21
vinyl chloride	0.01	0.0034	0.079
total xylenes	0.005	0.00061	270
TPH (U.S. EPA Methods 8015-M and 8015B-M)			
gasoline	1	0.3	NL
diesel	1	0.646	NL
JP-5	1	0.657	NL
motor oil	10	3.510	NL

Table 2-3 (continued)

Analyte (and Analytical Method)	REPORTING LIMITS		REGULATORY CRITERIA
	Target Quantitation Limit ^a (mg/kg)	Method Detection Limit ^b (mg/kg)	Residential Soil PRGs ^c (mg/kg)
SVOCs (U.S. EPA Method 8270C)			
aniline	1	0.031	85
benzoic acid	2	0.0296	100,000
benzyl alcohol	0.3	0.0558	18,000
bis(2-chloroethoxy)methane	0.3	0.0499	NL
bis(2-chloroethyl)ether	0.3^e	0.0500	0.21^e
bis(2-chloroisopropyl)ether	0.3	0.0473	2.9
bis(2-ethylhexyl)phthalate	0.3	0.0616	35
4-bromophenyl phenyl ether	0.3	0.0566	NL
butyl benzylphthalate	0.3	0.0555	12,000
carbazole	0.6	0.0816	24
4-chloroaniline	0.3	0.0165	240
4-chloro-3-methylphenol	0.3	0.0588	NL
2-chlorophenol	0.3	0.0443	63
4-chlorophenyl phenyl ether	0.3	0.0607	NL
dibenzofuran	0.3	0.0573	290
3,3'-dichlorobenzidine	2^e	0.0563	1.1^e
2,4-dichlorophenol	0.3	0.0505	180
diethyl phthalate	0.3	0.0621	49,000
1,4-dioxane	10	0.00117	44
dimethyl phthalate	0.3	0.0633	100,000
2,4-dimethylphenol	0.3	0.0439	1,200
di-n-butyl phthalate	0.3	0.0659	6,100
2,4-dinitrophenol	2	0.0537	120
2,6-dinitrotoluene	0.3	0.0606	61
2,4-dinitrotoluene	0.3	0.0638	120
di-n-octyl phthalate	0.3	0.0584	2,400
hexachlorobenzene	0.3	0.0603	0.3
hexachlorobutadiene	0.3	0.0517	NL
hexachloroethane	0.3	0.0499	35
isophorone	0.3	0.0570	510
2-methyl-4,6-dinitrophenol	2	0.0564	NL
2-methylnaphthalene	0.3	0.0504	NL
2-methylphenol	0.3	0.0452	3,100
3-methylphenol	0.3	0.0464	3,100
4-methylphenol	0.3	0.0464	310
2-nitroaniline	2^e	0.0624	1.7^e

Table 2-3 (continued)

Analyte (and Analytical Method)	REPORTING LIMITS		REGULATORY CRITERIA
	Target Quantitation Limit ^a (mg/kg)	Method Detection Limit ^b (mg/kg)	Residential Soil PRGs ^c (mg/kg)
SVOCs (U.S. EPA Method 8270C) (cont.)			
3-nitroaniline	2	0.0611	NL
4-nitroaniline	2	0.0728	NL
nitrobenzene	0.3	0.0498	20
2-nitrophenol	0.3	0.0478	NL
4-nitrophenol	2	0.0598	NL
n-nitrosodimethylamine	2 ^e	0.0506 ^e	0.0095 ^e
n-nitrosodi-n-propylamine	0.3 ^e	0.0549	0.069 ^e
n-nitrosodiphenylamine	0.3	0.0506	99
pentachlorophenol	2	0.0587	3
phenol	0.3	0.0430	37,000
pyridine	0.3	0.110	61
2,4,5-trichlorophenol	0.3	0.0601	6,100
2,4,6-trichlorophenol	0.3	0.0483	6.9 ^d
PAHs (U.S. EPA Method 8270C SIM)			
acenaphthene	0.03	0.0012	3,700
acenaphthylene	0.03	0.0013	NL
anthracene	0.02	0.0011	22,000
benz(a)anthracene	0.01	0.018	0.62
benzo(b)fluoranthene	0.01	0.0013	0.62
benzo(g,h,i)perylene	0.02	0.0015	NL
benzo(a)pyrene	0.01	0.0014	0.062
benzo(k)fluoranthene	0.03	0.0018	0.38 ^d
chrysene	0.03	0.0017	3.8 ^d
dibenz(a,h)anthracene	0.01	0.0014	0.062
fluoranthene	0.005	0.0019	2,300
fluorene	0.02	0.0014	2,700
indeno(1,2,3-cd)pyrene	0.01	0.0020	0.62
naphthalene	0.03	0.0009	56
phenanthrene	0.02	0.0017	NL
pyrene	0.05	0.0016	2,300
Pesticides (U.S. EPA Method 8081A)			
aldrin	0.005	0.0014	0.029
alpha-BHC	0.005	0.001	0.09
beta-BHC	0.005	0.001	0.32
gamma-BHC	0.005	0.0009	0.44
chlordane	0.005	0.0009	NL

Table 2-3 (continued)

Analyte (and Analytical Method)	REPORTING LIMITS		REGULATORY CRITERIA
	Target Quantitation Limit ^a (mg/kg)	Method Detection Limit ^b (mg/kg)	Residential Soil PRGs ^c (mg/kg)
Pesticides (U.S. EPA Method 8081A) (cont.)			
4,4'-DDD	0.005	0.0004	2.4
4,4'-DDE	0.005	0.0004	1.7
4,4'-DDT	0.005	0.0004	1.7
dieldrin	0.005	0.0011	0.03
endosulfan I	0.005	0.0004	NL
endosulfan II	0.005	0.0018	NL
endosulfan sulfate	0.005	0.0011	NL
endrin	0.005	0.0011	18
endrin aldehyde	0.005	0.0003	NL
heptachlor	0.005	0.0011	0.11
heptachlor epoxide	0.005	0.0011	0.053
toxaphene	0.25	0.0058	0.44
PCBs (U.S. EPA Method 8082)			
Aroclor 1016	0.1	0.0098	3.9
Aroclor 1221	0.2	0.0055	0.22
Aroclor 1232	0.1	0.004	0.22
Aroclor 1242	0.1	0.0026	0.22
Aroclor 1248	0.1	0.0014	0.22
Aroclor 1254	0.1	0.0016	0.22
Aroclor 1260	0.1	0.0036	0.22
TAL Metals (U.S. EPA Method 6010B/7000 Series)			
aluminum	10	4.0	76,000
antimony	0.5	0.21	31
arsenic	0.5 ^{e, f}	0.17	0.39 ^e
barium	0.5	0.047	5,400
beryllium	0.2	0.044	150
cadmium	0.5	0.028	37
calcium	10	0.824	NL
chromium, total	0.5	0.029	210
cobalt	0.5	0.051	900
copper	0.5	0.094	3,100
iron	5	1.63	23,000
lead	0.5	0.092	150 ^d
magnesium	5	2.41	NA
manganese	0.5	0.13	1,800

Table 2-3 (continued)

Analyte (and Analytical Method)	REPORTING LIMITS		REGULATORY CRITERIA
	Target Quantitation Limit ^a (mg/kg)	Method Detection Limit ^b (mg/kg)	Residential Soil PRGs ^c (mg/kg)
TAL Metals (U.S. EPA Method 6010B/7000 Series) (cont.)			
mercury	0.02	0.02	23
nickel	0.5	0.068	1,600
potassium	100	13.9	NL
selenium	0.5	0.24	390
silver	0.1	0.036	390
sodium	100	7.36	NL
thallium	2	0.021	5.2
vanadium	0.5	0.056	550
zinc	5	1.15	23,000
Chromium, Hexavalent (U.S. EPA Method 7196A)	0.5	0.25	30

Notes:

- ^a target quantitation limit represents the method reporting limit provided by the laboratory
^b based on APPL's most current method detection limit studies
^c U.S. EPA 2004
^d California-modified PRG
^e **bold** type indicates that a regulatory standard is below the reporting limit; in these cases, the reporting limit will be used as the decision threshold; however, these analytes have not been identified as COPCs at IR Site 35 in previous investigations
^f the target quantitation limit for arsenic is below the current Alameda Point background threshold (TtEMI 2001b)

Acronyms/Abbreviations:

APPL – Agriculture and Priority Pollutants Laboratories, Inc.
BHC – benzene hexachloride
COPC – chemical of potential concern
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethene
DDT – dichlorodiphenyltrichloroethane
IR – Installation Restoration (Program)
JP-5 – jet propellant grade 5
mg/kg – milligrams per kilogram
NA – not applicable
NL – not listed
PAH – polynuclear aromatic hydrocarbon
PCB – polychlorinated biphenyl
PRG – preliminary remediation goal
SVOC – semivolatile organic compound
TAL – target analyte list
TPH – total petroleum hydrocarbons
U.S. EPA – United States Environmental Protection Agency
VOC – volatile organic compound

Table 2-4
Reporting Limits and Regulatory Criteria for Groundwater

Analyte (and Analytical Method)	REPORTING LIMITS		WATER REGULATORY CRITERIA			
	Target Quantitation Limit ^a (µg/L)	Method Detection Limit ^b (µg/L)	California Primary MCL ^c (µg/L)	California Toxics Rule Saltwater Criterion Continuous Concentration ^{d,e} (µg/L)	U.S. EPA NRWQC Human Health for Consumption of Organisms Only ^{f,g} (µg/L)	California Toxics Rule Human Health for Consumption of Organisms Only ^h (µg/L)
VOCs (U.S. EPA Method 8260B)						
acetone	2	0.95	NL	NL	NL	NL
benzene	0.5	0.16	1	NL	51	71
bromobenzene	0.5	0.16	NL	NL	NL	NL
bromochloromethane	0.5	0.15	NL	NL	NL	NL
bromodichloromethane	0.5	0.14	NL	NL	17	46
bromoform	0.5	0.14	NL	NL	140	360
bromomethane	0.5	0.24	NL	NL	1,500	4,000
2-butanone	2	0.60	NL	NL	NL	NL
n-butylbenzene	0.5	0.15	NL	NL	NL	NL
sec-butylbenzene	0.5	0.12	NL	NL	NL	NL
tert-butylbenzene	0.5	0.13	NL	NL	NL	NL
carbon disulfide	0.5	0.20	NL	NL	NL	NL
carbon tetrachloride	0.5ⁱ	0.10	0.5ⁱ	NL	1.6	4.4
chlorobenzene	0.5	0.21	70	NL	1,600 ^j	21,000
chloroethane	0.5	0.21	NL	NL	NL	NL
chloroform	0.5	0.16	NL	NL	470	NL
chloromethane	0.5	0.31	NL	NL	NL	NL
2-chlorotoluene	0.5	0.14	NL	NL	NL	NL
4-chlorotoluene	0.5	0.13	NL	NL	NL	NL
dibromochloromethane	0.5	0.19	NL	NL	13	34
1,2-dibromo-3-chloropropane	2ⁱ	0.76ⁱ	0.2ⁱ	NL	NL	NL
dibromomethane	0.5	0.20	NL	NL	NL	NL
1,2-dibromoethane	0.5ⁱ	0.20ⁱ	0.05ⁱ	NL	NL	NL

Table 2-4 (continued)

Analyte (and Analytical Method)	REPORTING LIMITS		WATER REGULATORY CRITERIA			
	Target Quantitation Limit ^a (µg/L)	Method Detection Limit ^b (µg/L)	California Primary MCL ^c (µg/L)	California Toxics Rule Saltwater Criterion Continuous Concentration ^{d,e} (µg/L)	U.S. EPA NRWQC Human Health for Consumption of Organisms Only ^{f,g} (µg/L)	California Toxics Rule Human Health for Consumption of Organisms Only ^h (µg/L)
VOCs (U.S. EPA Method 8260B) (continued)						
1,2-dichlorobenzene	0.5	0.17	600	NL	1,300 ^j	17,000
1,3-dichlorobenzene	0.5	0.11	NL	NL	960	2,600
1,4-dichlorobenzene	0.5	0.19	5	NL	190 ^j	2,600
dichlorodifluoromethane	0.5	0.19	NL	NL	NL	NL
1,1-dichloroethane	0.5	0.19	5	NL	NL	NL
1,2-dichloroethane	0.5 ⁱ	0.20	0.5 ⁱ	NL	37	99
1,1-dichloroethene	0.5	0.30	6	NL	7,100 ^j	3.2
cis-1,2-dichloroethene	0.5	0.16	6	NL	NL	NL
trans-1,2-dichloroethene	0.5	0.19	10	NL	10,000 ^j	140,000
1,2-dichloropropane	0.5	0.17	5	NL	15	39
1,3-dichloropropane	0.5	0.17	NL	NL	NL	NL
2,2-dichloropropane	0.5	0.22	NL	NL	NL	NL
1,1-dichloropropene	0.5	0.20	NL	NL	NL	NL
cis-1,3-dichloropropene	0.5	0.15	NL	NL	21 ^j	1,700
trans-1,3-dichloropropene	0.5	0.18	NL	NL	21 ^j	1,700
ethylbenzene	0.5	0.23	300	NL	2,100 ^j	29,000
hexachlorobutadiene	0.5	0.19	NL	NL	NL	NL
2-hexanone	5	0.92	NL	NL	NL	NL
isopropylbenzene	0.5	0.16	NL	NL	NL	NL
4-isopropyltoluene	0.5	0.12	NL	NL	NL	NL
methyl tert-butyl ether	0.5	0.19	13	NL	NL	NL
methylene chloride	1	0.35	5	NL	590	NL
4-methyl-2-pentanone	5	1.9	NL	NL	NL	NL
naphthalene	0.5	0.36	NL	NL	NL	NL
n-propylbenzene	0.5	0.21	NL	NL	NL	NL

Table 2-4 (continued)

Analyte (and Analytical Method)	REPORTING LIMITS		WATER REGULATORY CRITERIA			
	Target Quantitation Limit ^a (µg/L)	Method Detection Limit ^b (µg/L)	California Primary MCL ^c (µg/L)	California Toxics Rule Saltwater Criterion Continuous Concentration ^{d,e} (µg/L)	U.S. EPA NRWQC Human Health for Consumption of Organisms Only ^{f,g} (µg/L)	California Toxics Rule Human Health for Consumption of Organisms Only ^h (µg/L)
VOCs (U.S. EPA Method 8260B) (continued)						
styrene	0.5	0.25	100	NL	NL	NL
1,1,1,2-tetrachloroethane	0.5	0.13	NL	NL	NL	NL
1,1,2,2-tetrachloroethane	0.5	0.27	1	NL	4	11
tetrachloroethene	0.5	0.15	5	NL	3.3	8.85
toluene	0.5	0.17	150	NL	15,000 ^j	200,000
1,2,3-trichlorobenzene	0.5	0.29	NL	NL	NL	NL
1,2,4-trichlorobenzene	0.5	0.21	5	NL	70 ^j	NL
1,1,1-trichloroethane	0.5	0.14	200	NL	NL	NL
1,1,2-trichloroethane	0.5	0.20	5	NL	16	42
trichloroethene	0.5	0.16	5	NL	30	81
trichlorofluoromethane	0.5	0.24	150	NL	NL	NL
1,2,3-trichloropropane	2.0	0.39	NL	NL	NL	NL
1,2,4-trimethylbenzene	0.5	0.19	NL	NL	NL	NL
1,3,5-trimethylbenzene	0.5	0.12	NL	NL	NL	NL
vinyl chloride	0.5 ⁱ	0.23	0.5 ⁱ	NL	2.4 ^j	525
total xylenes	0.5	0.19	1,800	NL	NL	NL
TPH (U.S. EPA Methods 8015-M and 8015B-M)						
gasoline	100	8.6	NL	NL	NL	NL
diesel	50	40.4	NL	NL	NL	NL
JP-5	50	33	NL	NL	NL	NL
motor oil	500	106	NL	NL	40,000	110,000

Table 2-4 (continued)

Analyte (and Analytical Method)	REPORTING LIMITS		WATER REGULATORY CRITERIA			
	Target Quantitation Limit ^a (µg/L)	Method Detection Limit ^b (µg/L)	California Primary MCL ^c (µg/L)	California Toxics Rule Saltwater Criterion Continuous Concentration ^{d,e} (µg/L)	U.S. EPA NRWQC Human Health for Consumption of Organisms Only ^{f,g} (µg/L)	California Toxics Rule Human Health for Consumption of Organisms Only ^h (µg/L)
SVOCs (U.S. EPA Method 8270C)						
aniline	25	6.9	NL	NL	NL	NL
benzoic acid	25	1.0	NL	NL	NL	NL
benzyl alcohol	10	2.0	NL	NL	NL	NL
bis(2-chloroethoxy)methane	10	2.4	NL	NL	NL	NL
bis(2-chloroethyl)ether	10 ⁱ	2.2 ⁱ	NL	NL	0.53 ⁱ	1.4 ⁱ
bis(2-chloroisopropyl)ether	10	2.0	NL	NL	65,000	170,000
bis(2-ethylhexyl)phthalate	10 ⁱ	2.9 ⁱ	4 ⁱ	NL	2.2 ⁱ	5.9 ⁱ
4-bromophenyl phenyl ether	10	2.6	NL	NL	NL	NL
butyl benzylphthalate	10	2.8	NL	NL	1,900	5,200
carbazole	10	3.3	NL	NL	NL	NL
4-chloroaniline	10	2.7	NL	NL	NL	NL
4-chloro-3-methylphenol	10	2.6	NL	NL	NL	NL
2-chlorophenol	10	2.0	NL	NL	150	400
4-chlorophenyl phenyl ether	10	2.6	NL	NL	NL	NL
dibenzofuran	10	2.4	NL	NL	NL	NL
di-n-butyl phthalate	10	3.2	NL	NL	4,500	12,000
3,3'-dichlorobenzidine	25 ⁱ	3.0 ⁱ	NL	NL	0.028 ⁱ	0.077 ⁱ
2,4-dichlorophenol	10	2.5	NL	NL	290	790
diethyl phthalate	10	3.0	NL	NL	44,000	120,000
2,4-dimethylphenol	10	2.4	NL	NL	850	2,300
dimethyl phthalate	10	2.9	NL	NL	1,100,000	2,900,000
2,4-dinitrophenol	25	1.8	NL	NL	5,300	14,000
2,4-dinitrotoluene	10 ⁱ	2.7	NL	NL	3.4 ⁱ	9.1 ⁱ
2,6-dinitrotoluene	10	2.7	NL	NL	NL	NL
di-n-octyl phthalate	10	2.6	NL	NL	NL	NL

Table 2-4 (continued)

Analyte (and Analytical Method)	REPORTING LIMITS		WATER REGULATORY CRITERIA			
	Target Quantitation Limit ^a (µg/L)	Method Detection Limit ^b (µg/L)	California Primary MCL ^c (µg/L)	California Toxics Rule Saltwater Criterion Continuous Concentration ^{d,e} (µg/L)	U.S. EPA NRWQC Human Health for Consumption of Organisms Only ^{f,g} (µg/L)	California Toxics Rule Human Health for Consumption of Organisms Only ^h (µg/L)
SVOCs (U.S. EPA Method 8270C) (continued)						
1,4-dioxane	1	0.162	NL	NL	NL	NL
fluorene	10	2.5	NL	NL	5,300	14,000
hexachlorobenzene	10 ⁱ	2.7 ⁱ	1 ⁱ	NL	0.00029 ⁱ	0.00077 ⁱ
hexachlorobutadiene	10	0.9	NL	NL	18	50
hexachloroethane	10 ⁱ	0.8	NL	NL	3.3 ⁱ	8.9 ⁱ
isophorone	10	2.5	NL	NL	960	600
2-methyl-4,6-dinitrophenol	25	2.2	NL	NL	280	765
2-methylnaphthalene	10	1.8	NL	NL	NL	NL
2-methylphenol	10	1.9	NL	NL	NL	NL
3-methylphenol	10	1.7	NL	NL	NL	NL
4-methylphenol	10	1.7	NL	NL	NL	NL
2-nitroaniline	25	2.4	NL	NL	NL	NL
3-nitroaniline	25	3.0	NL	NL	NL	NL
4-nitroaniline	25	2.5	NL	NL	NL	NL
nitrobenzene	10	2.1	NL	NL	690	1,900
2-nitrophenol	10	2.1	NL	NL	NL	NL
4-nitrophenol	25	0.8	NL	NL	NL	NL
n-nitrosodimethylamine	25 ⁱ	1.7	NL	NL	3 ⁱ	8.1 ⁱ
n-nitrosodiphenylamine	10 ⁱ	2.7	NL	NL	6 ⁱ	16
n-nitrosodi-n-propylamine	10 ⁱ	2.2 ⁱ	NL	NL	0.51 ⁱ	1.4 ⁱ
pentachlorophenol	25 ⁱ	2.8 ⁱ	1 ⁱ	7.9 ⁱ	3 ⁱ	8.2 ⁱ
phenol	10	1.0	NL	NL	1,700,000	4,600,000
pyridine	50	5.0	NL	NL	NL	NL
2,4,5-trichlorophenol	10	2.3	NL	NL	NL	NL
2,4,6-trichlorophenol	10	2.5 ⁱ	NL	NL	2.4 ⁱ	6.5

Table 2-4 (continued)

Analyte (and Analytical Method)	REPORTING LIMITS		WATER REGULATORY CRITERIA			
	Target Quantitation Limit ^a (µg/L)	Method Detection Limit ^b (µg/L)	California Primary MCL ^c (µg/L)	California Toxics Rule Saltwater Criterion Continuous Concentration ^{d,e} (µg/L)	U.S. EPA NRWQC Human Health for Consumption of Organisms Only ^{f,g} (µg/L)	California Toxics Rule Human Health for Consumption of Organisms Only ^h (µg/L)
PAHs (U.S. EPA Method 8270C SIM)						
acenaphthene	0.2	0.061	NL	NL	990	2,700
acenaphthylene	0.2	0.066	NL	NL	NL	NL
anthracene	0.2	0.11	NL	NL	40,000	110,000
benz(a)anthracene	0.2 ⁱ	0.069 ⁱ	NL	NL	0.018 ⁱ	0.049 ⁱ
benzo(b)fluoranthene	0.2 ⁱ	0.062 ⁱ	NL	NL	0.018 ⁱ	0.049 ⁱ
benzo(k)fluoranthene	0.2 ⁱ	0.095 ⁱ	NL	NL	0.018 ⁱ	0.049 ⁱ
benzo(g,h,i)perylene	0.2	0.079	NL	NL	NL	NL
benzo(a)pyrene	0.2 ⁱ	0.058 ⁱ	0.2	NL	0.018 ⁱ	0.049 ⁱ
chrysene	0.2 ⁱ	0.084 ⁱ	NL	NL	0.018 ⁱ	0.049 ⁱ
dibenz(a,h)anthracene	0.2 ⁱ	0.065 ⁱ	NL	NL	0.018 ⁱ	0.049 ⁱ
fluoranthene	0.2	0.082	NL	NL	140	370
fluorene	0.2	0.072	NL	NL	5,300	14,000
indeno(1,2,3-cd)pyrene	0.2 ⁱ	0.064 ⁱ	NL	NL	0.018 ⁱ	0.049 ⁱ
naphthalene	0.2	0.054	NL	NL	NL	NL
phenanthrene	0.2	0.079	NL	NL	NL	NL
pyrene	0.2	0.085	NL	NL	4,000	11,000
Pesticides (U.S. EPA Method 8081A)						
aldrin	0.02 ⁱ	0.009 ⁱ	NL	NL	0.00005 ⁱ	0.00014 ⁱ
alpha-BHC	0.02 ⁱ	0.005 ⁱ	NL	NL	0.0049 ⁱ	0.013 ⁱ
beta-BHC	0.02 ⁱ	0.008	0.2	NL	0.017 ⁱ	0.046
gamma-BHC	0.02	0.005	NL	NL	1.8 ^j	0.063
chlordane	0.02 ⁱ	0.007 ⁱ	NL	0.004 ⁱ	0.00081 ⁱ	0.00059 ⁱ
4,4'-DDD	0.02 ⁱ	0.003 ⁱ	NL	NL	0.00031 ⁱ	0.00084 ⁱ
4,4'-DDE	0.02 ⁱ	0.004 ⁱ	NL	NL	0.00022 ⁱ	0.00059 ⁱ

Table 2-4 (continued)

Analyte (and Analytical Method)	REPORTING LIMITS		WATER REGULATORY CRITERIA			
	Target Quantitation Limit ^a (µg/L)	Method Detection Limit ^b (µg/L)	California Primary MCL ^c (µg/L)	California Toxics Rule Saltwater Criterion Continuous Concentration ^{d,e} (µg/L)	U.S. EPA NRWQC Human Health for Consumption of Organisms Only ^{f,g} (µg/L)	California Toxics Rule Human Health for Consumption of Organisms Only ^h (µg/L)
Pesticides (U.S. EPA Method 8081A) (continued)						
4,4'-DDT	0.02 ⁱ	0.007 ⁱ	NL	0.001 ⁱ	0.00022 ⁱ	0.00059 ⁱ
dieldrin	0.02 ⁱ	0.005 ⁱ	NL	0.0019 ⁱ	0.000054 ⁱ	0.00014 ⁱ
endosulfan I	0.02 ⁱ	0.005	NL	0.0087 ⁱ	89	240
endosulfan II	0.02 ⁱ	0.004	NL	0.0087 ⁱ	89	240
endosulfan sulfate	0.02	0.005	NL	NL	89	240
endrin	0.02 ⁱ	0.007 ⁱ	2	0.0023 ⁱ	0.06 ^j	0.81
endrin aldehyde	0.02	0.009	NL	NL	0.3	0.81
heptachlor	0.02 ⁱ	0.008 ⁱ	0.01 ⁱ	0.0036 ⁱ	0.000079 ⁱ	0.00021
heptachlor epoxide	0.02 ⁱ	0.007 ⁱ	0.01 ⁱ	0.0036 ⁱ	0.000039 ⁱ	0.00011 ⁱ
toxaphene	20 ^{d,i}	0.038 ⁱ	3 ^{d,i}	0.0002 ⁱ	0.00028 ⁱ	0.00075 ⁱ
PCBs (U.S. EPA Method 8082)						
Aroclor 1016	0.2 ⁱ	0.12 ⁱ	0.5	0.03 ⁱ	0.000064 ⁱ	0.00017 ⁱ
Aroclor 1221	0.4 ⁱ	0.08 ⁱ	0.5	0.03 ⁱ	0.000064 ⁱ	0.00017 ⁱ
Aroclor 1232	0.2 ⁱ	0.12 ⁱ	0.5	0.03 ⁱ	0.000064 ⁱ	0.00017 ⁱ
Aroclor 1242	0.2 ⁱ	0.12 ⁱ	0.5	0.03 ⁱ	0.000064 ⁱ	0.00017 ⁱ
Aroclor 1248	0.2 ⁱ	0.09 ⁱ	0.5	0.03 ⁱ	0.000064 ⁱ	0.00017 ⁱ
Aroclor 1254	0.2 ⁱ	0.20 ⁱ	0.5	0.03 ⁱ	0.000064 ⁱ	0.00017 ⁱ
Aroclor 1260	0.2 ⁱ	0.09 ⁱ	0.5	0.03 ⁱ	0.000064 ⁱ	0.00017 ⁱ
TAL Metals (U.S. EPA Method 6010B/7000 Series)						
aluminum	100	19.3	1,000	NL	NL	NL
antimony	50 ⁱ	1.84	6 ⁱ	NL	640	4,300
arsenic ^k	5 ⁱ	2.45 ⁱ	50 (10 ^l)	36	0.14 ⁱ	NL
barium	5	0.75	1,000	NL	NL	NL
beryllium	5 ⁱ	0.24	4 ⁱ	NL	NL	NL

Table 2-4 (continued)

Analyte (and Analytical Method)	REPORTING LIMITS		WATER REGULATORY CRITERIA			
	Target Quantitation Limit ^a (µg/L)	Method Detection Limit ^b (µg/L)	California Primary MCL ^c (µg/L)	California Toxics Rule Saltwater Criterion Continuous Concentration ^{d,c} (µg/L)	U.S. EPA NRWQC Human Health for Consumption of Organisms Only ^{f,g} (µg/L)	California Toxics Rule Human Health for Consumption of Organisms Only ^h (µg/L)
TAL Metals (U.S. EPA Method 6010B/7000 Series) (continued)						
cadmium	5 ⁱ	0.51	5 ⁱ	9.3	NL	NL
calcium	100	27.2	NL	NL	NL	NL
chromium	5	1.365	50	NL	NL	NL
cobalt	10	0.63	NL	NL	NL	NL
copper	10 ⁱ	0.97	NL	3.1 ⁱ	NL	NL
iron	50	25.8	NL	NL	NL	NL
lead	1 ⁱ	1.85	15 ^m	8.1	NL	NL
magnesium	100	12.9	NL	NL	NL	NL
manganese	5	1.23	NL	NL	NL	NL
mercury	0.2 ⁱ	0.041 ⁱ	2	0.025 ^{i,n}	NL	0.051 ⁱ
nickel	20 ⁱ	3.61	100	8.2 ⁱ	4,600	4,600
potassium	2,000	99.5	NL	NL	NL	NL
selenium	5	3.17	50	71	4,200	NL
silver	10	0.73	NL	NL	NL	NL
sodium	1,000	111.1	NL	NL	NL	NL
thallium	5 ⁱ	1.97 ⁱ	2 ⁱ	NL	0.47 ^{i,j}	6.3
vanadium	10	0.97	NL	NL	NL	NL
zinc	50	31.8	NL	81	26,000	NL
Chromium, Hexavalent (U.S. EPA 7196A)	50	6.0	NL	50	NL	NL
Mercury (U.S. EPA 1631)	0.00025	0.1 (ng/L)	2	0.025 ⁿ	NL	0.051

Notes:

^a target quantitation limit represents the method reporting limit provided by the laboratory^b based on APPL's most current method detection limit studies^c DHS 2003

Table 2-4 (continued)

Notes: (continued)

^d U.S. EPA 2000a

^e criterion continuous concentration equals the highest concentration of a pollutant to which aquatic life can be exposed for an extended period of time (4 days) without harmful effects

^f 10⁻⁶ risk for carcinogens

^g U.S. EPA 2004

^h Fed. Reg. 65 no. 97 (18 May 2000) / Rules and Regulation

ⁱ **bold** type indicates that a regulatory standard is below the reporting limit; in these cases, the reporting limit will be used as the decision threshold; however, these analytes have not been identified as COPCs at IR Site 35 in previous investigations, except for pesticides that may be present in groundwater at AOC 3; however, AOC 3 is located over 200 feet from Oakland Inner Harbor; because pesticides tend to sorb to soil rather than dissolve into groundwater, it is considered unlikely that concentrations below the detection limits listed in this table would reach Oakland Inner Harbor via migration in groundwater

^j Fed. Reg. 68 no. 250 (31 December 2003) / Notices

^k the target quantitation limit for arsenic is below the Alameda Point background threshold (TtEMI 2001)

^l federal MCL for arsenic required by 2006, although reporting requirements begin in 2002

^m regulatory action level

ⁿ San Francisco Bay RWQCB Basin Plan per footnote b of 40 C.F.R. Part 131.38(b)(1)

Acronyms/Abbreviations:

AOC – area of concern

APPL – Agriculture and Priority Pollutants Laboratories, Inc.

Basin Plan – Comprehensive Water Quality Plan for the San Francisco Bay Basin

BHC – benzene hexachloride

C.F.R. – *Code of Federal Regulations*

COPC – chemical pf potential concern

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethene

DDT – dichlorodiphenyltrichloroethane

DHS – (California) Department of Health Services

Fed. Reg. – *Federal Register*

IR – Installation Restoration (Program)

JP-5 – jet propellant grade 5

µg/L – micrograms per liter

MCL – maximum contaminant level

ng/L – nanograms per liter

NL – not listed

NRWQC – National Recommended Water Quality Criteria

PAH – polynuclear aromatic hydrocarbon

PCB – polychlorinated biphenyl

RWQCB – (California) Regional Water Quality Control Board

SIM – selected ion monitoring

SVOC – semivolatile organic compound

TAL – target analyte list

U.S. EPA – United States Environmental Protection Agency

VOC – volatile organic compound

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Table 2-5
Navy CLEAN Program Analytical Data Quality Objectives

Analytical Category and Parameter	Method	MS/MSD ACCURACY CRITERIA (percent recovery)		LCS ACCURACY CRITERIA ^a (percent recovery)		PRECISION (maximum RPD)	
		Soil	Water	Soil	Water	Soil	Water
VOCs	U.S. EPA Methods 5035A and 8260B (EPA SW-846)						
benzene ^b		65-140	75-130	75-125	80-120	20	20
chlorobenzene		60-135	75-130	75-125	80-120	20	20
1,2-dichloroethane		75-125	75-125	70-135	70-130	20	20
1,1-dichloroethene ^b		60-170	60-145	65-135	70-130	20	25
trans-1,2-dichloroethene		75-125	75-125	65-135	60-140	20	20
ethylbenzene		75-125	75-125	75-125	75-125	20	20
tetrachloroethene		75-125	75-125	65-140	45-150	20	20
toluene ^b		60-140	75-125	70-125	75-120	20	20
1,1,1-trichloroethane		75-125	75-125	70-135	65-130	20	20
trichloroethene ^b		60-140	70-120	75-125	70-125	20	20
xylene (total)		75-125	75-125	80-125	75-130	20	20
Surrogates							
bromofluorobenzene		75-120	85-115	85-120	75-120	NA	NA
1,2-dichloroethane-d ₄		70-120	75-115	52-149	70-120	NA	NA
toluene-d ₈		80-115	90-110	85-115	85-120	NA	NA
TPH	U.S. EPA Methods 8015-M/8015B-M (CA-LUFT Manual)/EPA SW-846						
gasoline		20-115	20-135	67-136	67-136	30	30
diesel		47-146	23-132	47-146	23-132	30	25
Surrogates							
bromofluorobenzene	TPH-gasoline	70-130	55-165	64-148	74-138	NA	NA
a,a,a,TFT	TPH-gasoline	64-148	60-133	64-148	60-133	NA	NA
ocatacosane	TPH-extractable	20-105	25-95	15-105	25-95	NA	NA
terphenyl	TPH-extractable	50-150	50-150	50-150	50-150	NA	NA
SVOCs	U.S. EPA Method 8270C (EPA SW-846)						
4-chloro-3-methylphenol		25-110	20-120	45-115	45-110	25	30
2-chlorophenol		25-110	25-120	35-105	35-105	25	25
1,4-dichlorobenzene		30-110	20-120	30-125	25-135	25	25
2,4-dinitrotoluene		50-120	15-150	39-139	29-149	25	30
4-nitrophenol		15-135	10-140	15-140	10-125	30	30
n-nitroso-di-n-propylamine		25-120	25-120	37-135	25-135	25	25
pentachlorophenol		20-125	25-115	50-115	10-125	25	30
phenol		30-110	15-105	40-100	10-115	25	25
1,2,4-trichlorobenzene		35-110	45-115	44-142	34-152	25	30

Table 2-5 (continued)

Analytical Category and Parameter	Method	MS/MSD ACCURACY CRITERIA (percent recovery)		LCS ACCURACY CRITERIA ^a (percent recovery)		PRECISION (maximum RPD)	
		Soil	Water	Soil	Water	Soil	Water
Surrogates							
2-fluorobiphenyl		30–115	45–115	45–105	50–110	NA	NA
2-fluorophenol		20–120	20–105	35–105	20–110	NA	NA
nitrobenzene-d ₅		25–135	30–125	35–105	40–110	NA	NA
phenol-d ₅		30–125	15–115	40–100	10–115	NA	NA
p-terphenyl-d ₁₄		20–145	35–140	30–125	50–115	NA	NA
2,4,6-tribromophenol		20–125	10–130	35–125	50–135	NA	NA
PAHs U.S. EPA Method 8270C SIM (EPA SW-846)							
acenaphthene		30–150	30–140	30–150	30–140	30	30
acenaphthylene		30–150	30–140	30–150	30–140	30	30
anthracene		30–150	30–140	30–150	30–140	30	30
benz(a)anthracene		30–150	30–140	30–150	30–140	30	30
benzo(b)fluoranthene		30–150	30–140	30–150	30–140	30	30
benzo(k)fluoranthene		30–150	30–140	30–150	30–140	30	30
benzo(g,h,i)perylene		30–150	30–140	30–150	30–140	30	30
benzo(a)pyrene		30–150	30–140	30–150	30–140	30	30
chrysene		30–150	30–140	30–150	30–140	30	30
dibenz(a,h)anthracene		30–150	30–140	30–150	30–140	30	30
fluorene		30–150	30–140	30–150	30–140	30	30
indeno(1,2,3-cd)pyrene		30–150	30–140	30–150	30–140	30	30
2-methylnaphthalene		30–150	30–140	30–150	30–140	30	30
naphthalene		30–150	30–140	30–150	30–140	30	30
phenanthrene		30–150	30–140	30–150	30–140	30	30
pyrene		30–150	30–140	30–150	30–140	30	30
Surrogates							
2-fluorobiphenyl		10–130	10–130	10–130	10–130	NA	NA
nitrobenzene-d ₃		10–130	10–130	10–130	10–130	NA	NA
terphenyl-d ₁₄		10–130	10–130	10–130	10–130	NA	NA
Pesticides U.S. EPA Method 8081A (EPA SW-846)							
aldrin		40–130	40–130	45–140	25–140	30	30
gamma-BHC (lindane) ^c		30–150	30–150	60–135	25–135	30	35
4,4'-DDT		50–160	50–160	45–140	45–140	30	35
dieldrin		35–145	35–145	60–140	45–140	30	20
endrin		30–170	30–170	60–160	45–170	30	20
heptachlor		35–145	35–145	50–140	40–145	30	20
Surrogates							
DCB		30–150	30–150	30–150	30–150	NA	NA
TCMX		30–150	30–150	30–150	30–150	NA	NA

Table 2-5 (continued)

Analytical Category and Parameter	Method	MS/MSD ACCURACY CRITERIA (percent recovery)		LCS ACCURACY CRITERIA ^a (percent recovery)		PRECISION (maximum RPD)	
		Soil	Water	Soil	Water	Soil	Water
PCBs	U.S. EPA Method 8082 (EPA SW-846)						
Aroclor 1016		40–140	40–140	40–140	40–140	30	25
Aroclor 1260		40–140	40–140	40–140	40–140	30	25
Surrogates							
DCB		30–150	30–150	30–150	30–150	NA	NA
Metals^d	U.S. EPA Method 6010B/7000 Series						
aluminum		75–125	75–125	95–115	95–115	20	20
antimony		75–125	75–125	80–110	80–110	20	20
arsenic		75–125	75–125	80–120	80–120	20	20
barium		75–125	75–125	85–105	85–105	20	20
beryllium		75–125	75–125	85–105	85–105	20	20
cadmium		75–125	75–125	75–110	75–110	20	20
chromium (total)		75–125	75–125	80–110	80–110	20	20
cobalt		75–125	75–125	80–105	80–105	20	20
copper		75–125	75–125	85–105	85–105	20	20
iron		75–125	75–125	80–115	80–115	20	20
lead (total)		75–125	75–125	80–120	80–120	20	20
manganese		75–125	75–125	85–105	85–105	20	20
mercury		75–125	75–125	80–120	80–120	20	20
nickel		75–125	75–125	80–105	80–105	20	20
selenium		75–125	75–125	80–120	80–120	20	20
silver		75–125	75–125	80–120	80–120	20	20
thallium		75–125	75–125	80–115	80–115	20	20
vanadium		75–125	75–125	80–115	80–115	20	20
zinc		75–125	75–125	80–110	80–110	20	20

Notes:

- ^a accuracy criteria are for guidance only; laboratory specific limits are determined utilizing control charts generated during the analysis of CLEAN Program samples; use these limits until sufficient data are generated
- ^b for all sample QC associated with CLEAN Program samples, at a minimum, these compounds must be spiked
- ^c gamma isomer of benzene hexachloride
- ^d the QC criteria for metals apply to all analyses by U.S. EPA Method 6010B/7000 Series

Acronyms/Abbreviations:

BHC – benzene hydrochloride
 CLEAN – Comprehensive Long-Term Environmental Action Navy
 DCB – decachlorobiphenyl
 DDT – dichlorodiphenyltrichloroethane
 LCS – laboratory control sample
 LUFT – leaking underground fuel tank
 MS – matrix spike
 MSD – matrix spike duplicate

Table 2-5 (continued)

Acronyms/Abbreviations: (continued)

NA – not applicable
PAH – polynuclear aromatic hydrocarbon
PCB – polychlorinated biphenyl
QC – quality control
RPD – relative percent difference
SIM – selected ion monitoring
SVOC – semivolatile organic compound
SW – solid waste
TCMX – tetrachloro-m-xylene
TFT – trifluorotoluene
TPH – total petroleum hydrocarbons
U.S. EPA – United States Environmental Protection Agency
VOC – volatile organic compound

APPENDIX A1

STUDY AREAS AT IR SITE 35

FOREWORD

Installation Restoration (IR) Program Site 35 is defined as those areas in Transfer Parcel Economic Development Conveyance (EDC)-5 that have been identified by the Navy and regulatory agencies as needing further evaluation before early property transfer can occur. The study areas for evaluation in IR Site 35 are the following:

- 23 areas of concern (AOCs)
 - 19 AOCs (AOCs 1, 2, 3, 5, 6, 8 through 13, 15, 17, 18, 20, 21, 23, 24, and 25) that require additional sampling and analysis
 - 4 AOCs (AOCs 4, 7, 14, and 16) that have sufficient data to perform human-health risk analyses
- 3 data gap areas
 - Environmental Baseline Survey (EBS) Parcel 78
 - EBS Parcel 79
 - EBS Parcel 205
- 9 solid waste management units (SWMUs)
 - 1 oil/water separator (OWS) (OWS 017)
 - 7 aboveground storage tanks (ASTs) (ASTs 016, 039, 152, 173A, 173B, 173C, and 392)
 - 1 underground storage tank (UST) (UST[R]-11, also known as Tank 393)
- polynuclear aromatic hydrocarbon (PAH) areas
 - PAH areas identified for inclusion in the feasibility study (FS) address residual benzo(a)pyrene equivalent concentrations that are above the Alameda Point screening criterion of 620 micrograms per kilogram ($\mu\text{g/kg}$) but do not drive risk above 10^{-5} . No additional samples are proposed in the PAH areas that are outside of AOCs. Also, as agreed upon with United States Environmental Protection Agency (U.S. EPA) on November 14, 2005, baseline risks will not be calculated for the PAH areas.

California Environmental Protection Agency Department of Toxic Substances Control (DTSC) also identified lead-based paint, chlordane, and sanitary and industrial waste sewer lines as outstanding issues, and requested a comparison of detection limits from previous sampling results with RI comparison criteria. The Navy has policies for addressing the first two issues and will follow these policies. The last issue, along with the comparison of detection limits with RI criteria, will be addressed during the RI, and results will be presented in the RI report. The Navy and agencies will assess whether additional samples will be needed to resolve these issues and determine the best timing to collect data, considering the transfer schedule.

The Navy is aware that contaminated groundwater from adjacent IR sites may have impacted areas within IR Site 35. The Navy will address this groundwater contamination as part of the existing Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

program IR sites including IR Sites 3, 4, and 21 (Operable Unit [OU]-2B); IR Site 5 (OU-2C); IR Sites 6, 7, and 8 (OU-1); and IR Sites 26 and 28 (OU-6).

The locations of AOCs, data gap areas, and SWMUs are shown on Figure A1-1. The boundaries of some areas of IR Site 35 shown may need to be revised based on the RI/FS results. Also, AOCs that were identified solely because of the presence of PAHs may be incorporated into the PAH areas.

Detailed features of each study area are shown on Figures A1-2 through A1-34.

The study areas for IR Site 35 are discussed individually in area-specific sections in this appendix. The description for each area includes location, historic uses, sampling results from previous investigations, and the proposed RI sampling plan. To facilitate these discussions, summaries of data sources and source documents, screening criteria, the RI sampling approach, and analytical methods are presented in this Foreword.

DATA SOURCES

Data from the following sources were evaluated as part of the final Site Inspection Report for Transfer Parcel EDC-5 (BEI 2005b) and are summarized in this appendix for each IR Site 35 study area:

- soil and groundwater analytical results available in the 2003 ArcView Query Station from the investigations discussed in Section 3 of the Work Plan (excluding data from samples collected under the Alameda Point Total Petroleum Hydrocarbons (TPH) Program, manhole sediment data collected as part of the storm sewer investigation, and soil PAH data from the EBS; PAH data from the EBS were not used because analytical results had detection limits higher than current regulatory criteria)
- confirmation soil sampling results associated with removal actions for lead, pesticides, and PAHs that have been obtained from the source documents for the respective removal actions

The above data sets for samples collected at each AOC, data gap area, and SWMU area are presented in Appendix A2 to the Sampling and Analysis Plan (SAP).

SOURCE DOCUMENTS

The following 27 environmental reports summarize the results of studies conducted within the boundaries of IR Site 35:

- Data Summary Report, RI/FS Phases 2B and 3 (PRC Environmental and Montgomery 1992)
- EBS/Community Environmental Response Facilitation Act Report (ERM-West 1994a)
- Parcel Evaluation Plans (ERM-West 1994b)
- RI/FS Data Transmittal Memorandum for Sites 4, 5, 8, 10A, 12, and 14 (PRC Environmental and Montgomery 1996)

Foreword

- Data Summary Report, Quarterly Groundwater Monitoring, November 1997–August 1998 (TtEMI and Uribe & Associates 1998)
- Fuel Pipeline Oversight and Sampling Report (TtEMI 2000)
- EBS Data Evaluation Summary (IT 2001a)
- Field Summary Report for the OU-5 Addendum Activities (Parcels 98, 99, 100, 103, 178, and the North Village Housing Area) (IT 2001b)
- Storm Sewer Study Report, TPH Addendum (TtEMI 2001a)
- Summary Report, Data Gap Investigation at Corrective Action Areas and Other Locations at Alameda Point (TtEMI 2001b)
- Summary of Background Concentrations in Soil and Groundwater, Alameda Point (TtEMI 2001c)
- No Further Action Report, Request for No Further Action, UST 393 (TtEMI 2002a)
- Engineering Evaluation and Cost Analysis for Water Tower and Antenna Sites Lead Removal Action (TtEMI 2002b)
- Data Summary Report, Supplemental RI Data Gap Sampling for OU-1 and OU-2 (TtEMI 2002c)
- Supplemental EBS (TtEMI 2002d)
- Underground Fuel Line Abandonment Report (IT 2002)
- Site Closure Report for Parcels 79, 98, 105, 106, and 107 Non-Time-Critical Removal Action (Shaw 2003)
- Field Activity Report Assessment of PAH Contamination at Selected CERCLA Sites and EBS Parcels (BEI 2004)
- RI Report, Sites 6, 7, 8, and 16, Alameda Point (TtEMI 2004)
- Petroleum ASTs Assessment and Closure Request, Alameda Point (SulTech 2004)
- Project Close-Out Report, CERCLA Time-Critical Removal Action at West Housing Area (Foster Wheeler 2004)
- Removal Action Site Closure Report, Revision 1, Time-Critical Removal Action for Building 195, Pesticide Shed Demolition and Soil Removal (Shaw 2004a)
- Work Plan, Basewide Groundwater Monitoring Program (Shaw 2004b)
- SWMU Evaluation Report for Transfer Parcel EDC-5 (SulTech 2005a)
- FS Report for OU-1, Sites 6, 7, 8, and 16 (SulTech 2005b)
- PAH Field Activity Study (includes results of the 2002 PAH investigation) (BEI 2005a)
- Site Inspection Report for Transfer Parcel EDC-5 (BEI 2005b)

Pertinent data from these studies are discussed in area-specific summaries of previous investigations in this appendix. Data from these investigations are presented in Appendix A2 to the SAP.

SCREENING CRITERIA

Data from previous investigations at the study areas in IR Site 35 are reported above or below screening criteria as follows.

- Concentrations of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) (excluding PAHs), pesticides, polychlorinated biphenyls (PCBs), and metals in soil were compared to their respective U.S. EPA Region 9 preliminary remediation goals (PRGs) for residential soil; California-modified PRGs were used where available (U.S. EPA 2004).
- Concentrations of TPH in soil were compared to the Alameda Point-specific residential preliminary remediation criteria (DON 2001b). However, as requested by the regulatory agencies, the RI will compare TPH concentrations to San Francisco Bay Regional Water Quality Control Board (RWQCB) environmental screening levels (Cal/EPA 2005).
- Concentrations of PAHs in soil were assessed by calculating benzo(a)pyrene equivalent concentrations and comparing these benzo(a)pyrene equivalents to the Alameda Point-specific residential soil screening value of 620 µg/kg (DON 2001a).
- Concentrations of metals in soil that were above residential PRGs were compared to threshold background concentrations developed specifically for Alameda Point (TtEMI 2001c, SulTech 2005b) (Table A1-2). A metal concentration is considered an exceedance if it is greater than both the residential PRG and the background threshold concentration.

After submittal of the draft Work Plan, the Navy and regulatory agencies initiated discussions to revisit the background concentrations and data set for Alameda Point at a meeting held on October 18, 2005 (DON 2005). It was agreed that the 95th percentile or quantile would be more appropriate for comparison as part of the assessment of contaminant nature and extent. The comparison criteria that will be used in the RI report will reflect any updated agreements reached by the time the RI report is prepared.

- VOCs, SVOCs, pesticides, PCBs, and metals in groundwater were compared to the lower of federal and California primary maximum contaminant levels. No residential screening criteria (Alameda Point preliminary remediation criteria) exist for TPH in groundwater.

Exceedances of the screening criteria listed above are summarized in Tables A1-3 through A1-9 and discussed in this appendix for contaminants reported in each IR Site 35 study area. Data from adjacent IR sites will also be reviewed and evaluated to assess whether contaminants are associated with these sites or historical IR Site 35 activities.

Foreword

REMEDIAL INVESTIGATION SAMPLING APPROACH

Soil samples will generally be collected at two depth intervals (0 to 2 and 2 to 4 feet below ground surface [bgs]) using the direct-push sampling method. Except at two locations, a third sample will be collected immediately above the water table in the 4-to-8-foot-bgs depth interval; if groundwater is encountered at depths shallower than 4 feet bgs, a saturated soil sample will be collected in this depth interval. The third samples from the borings at AOC 1 that are next to two OWSs (OWS 63A and 63C) will be collected in the 10-to-12-foot-bgs interval, which is below the bottoms of the OWSs. Depending on field conditions, soil samples may be collected using hand-auger equipment.

In response to a comment on the draft Work Plan, two sediment samples will be collected to assess whether lead-containing soil may have entered the storm sewer system during the removal action at AOC 12. These samples will be collected using a clean stainless-steel hand auger.

Discrete groundwater samples will be collected using the HydroPunch or equivalent sampling method. Groundwater will also be collected from one existing monitoring well. The discrete groundwater samples will be collected from the first water-bearing zone from approximately 5 to 10 feet below the groundwater table in each area to allow for sufficient sample volume. Assumed groundwater flow directions were used to aid in the placement of some borings; groundwater flow directions shown on figures are based on 2004 groundwater-level elevations (Figure 2-5 of the Work Plan). In response to regulatory agency requests, borings were added to those proposed in the draft Work Plan, and samples targeting specific features (e.g., an AST or OWS) will be located as close to the feature as possible.

The historical presence of chemicals in an area at concentrations above the screening criteria described above does not necessarily indicate that there is a health concern; however, these areas were designated by the Navy and regulatory agencies as requiring further evaluation as part of the RI for IR Site 35. The Navy and regulatory agencies held four planning meetings from May through July 2005. The Navy also had a telephone conference call with U.S. EPA on November 14 and with DTSC on November 17 and 21 (San Francisco Bay RWQCB participated in the beginning of the call on November 21) to discuss comments on the draft Work Plan (DON 2005). Based on discussions in these meetings and telephone calls, agreement on the overall approach was reached, including:

- areas where additional samples will be collected,
- number of borings and types of samples (soil and/or discrete groundwater) at each area,
- numbers and depths of soil samples to be collected per boring, and
- types of analyses that will be performed on samples from each area.

These agreements are reflected in Table 1-5 of the SAP and in discussions of the proposed sampling plan for each IR Site 35 study area presented in this appendix.

ANALYTICAL METHODS

Unless otherwise specified, one or more of the following analytical methods will be used for the samples from the proposed IR Site 35 sampling locations:

- U.S. EPA Methods 5035A and 8260B for VOCs
- U.S. EPA Method 8015B-M with silica gel cleanup for extractable-range TPH (fuel fingerprint)
- U.S. EPA Method 8015-M for purgeable-range TPH (as gasoline)
- U.S. EPA Method 8270C for SVOCs (non-PAHs)
- U.S. EPA Method 8270C with selected ion monitoring for PAHs
- U.S. EPA Method 8081A for pesticides
- U.S. EPA Method 8082 for PCBs
- U.S. EPA Method 6010B/7000 series for metals
- U.S. EPA Method 1631 for mercury (low-level detection limits for groundwater samples collected within 500 feet of the shoreline)
- U.S. EPA 7196A for hexavalent chromium (AOC 17 only)
- U.S. EPA Method 160.1 for total dissolved solids (groundwater only)

Because discrete groundwater samples are commonly turbid due to the presence of suspended solids, samples collected for metals will be filtered in the field prior to analysis.

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ACRONYMS/ABBREVIATIONS

AOC	area of concern
AST	aboveground storage tank
B(a)P	benzo(a)pyrene
BEI	Bechtel Environmental, Inc.
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CAA	corrective action area
CD	compact disk
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
CTO	contract task order
DQO	data quality objective
DTSC	(California Environmental Protection Agency) Department of Toxic Substances Control
EBS	environmental baseline survey
EDC	economic development conveyance
EE/CA	engineering evaluation/cost analysis
FS	feasibility study
GAP	generator accumulation point
HHRA	human-health risk assessment
IR	Installation Restoration (Program)
JP-5	jet propellant grade 5
LBP	lead-based paint
LeadSpread 7	Lead Risk Assessment Spreadsheet Version 7
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
NADEP	Naval Aviation Depot
NAS	Naval Air Station
NFA	no further action

ng/L	nanograms per liter
NTCRA	non-time-critical removal action
OU	operable unit
OWS	oil/water separator
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PEP	parcel evaluation plan
PRG	preliminary remediation goal
RAO	removal action objective
RI	remedial investigation
RWQCB	(California) Regional Water Quality Control Board
SAP	sampling and analysis plan
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TCE	trichloroethene
TCRA	time-critical removal action
TDS	total dissolved solids
TPH	total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
U.S. EPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound

Appendix A1

STUDY AREAS AT IR SITE 35

Investigation issues at Installation Restoration (IR) Program Site 35 have been divided into three groups, based on similarities of sampling rationale and design:

- areas of concern (AOCs) (except AOCs that only address oil/water separators [OWSs]) and data gap areas
- OWSs
- aboveground storage tanks (ASTs) and one underground storage tank (UST)

Three sets of data quality objectives (DQOs) were developed as sitewide approaches for these investigation issues (Tables 1-2, 1-3, and 1-4 in the Sampling and Analysis Plan [SAP]). The DQO sets apply to study areas at IR Site 35 as follows:

- **DQOs for AOCs (except AOCs that only address OWSs; specifically AOCs 1, 20, and 24) and data gap areas** (Table 1-2 in the SAP) apply to the following:
 - AOCs 2 through 18, 21, 23, and 25
 - Environmental Baseline Survey (EBS) Parcels 78, 79, and 205
- **DQOs for OWSs** (Table 1-3 in the SAP) apply to the following:
 - OWS 063A, -B, -C (located in AOC 1)
 - OWS 12A, -B (located in AOC 20)
 - OWS 067 (located in AOC 23)
 - OWS 118 (located in AOC 24)
 - OWS 017 (identified as a solid waste management unit [SWMU] outside the AOCs)
- **DQOs for ASTs and one UST** (Table 1-4 in the SAP) apply to the following:
 - UST(R)-11 (located in AOC 23)
 - ASTs 016, 039, 152, 173A, 173B, 173C, and 392 (identified as SWMUs outside the AOCs)

The Navy is aware that contaminated groundwater from adjacent IR sites may have impacted areas within IR Site 35. The Navy will address this groundwater contamination as part of the existing Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) program IR sites including IR Sites 3, 4, and 21 (Operable Unit [OU]-2B); IR Site 5 (OU-2C); IR Sites 6, 7, and 8 (OU-1); and IR Sites 26 and 28 (OU-6).

The purpose of this appendix is to describe each study area (including historical uses and previous investigations) and provide area-specific problem statements and optimized sampling designs (DQO Steps 1 and 7). In response to regulatory agency requests, borings were added to those proposed in the draft Work Plan, and samples targeting specific features (e.g., an AST or OWS) will be located as close to the feature as possible.

AOCs, data gap areas, and SWMUs are shown on Figure A1-1. Summaries of proposed sampling and analyses for all areas are presented in Table 1-5 of the SAP. Locations sampled

during previous investigations as well as proposed remedial investigation (RI) sampling locations are shown on Figures A1-2 through A1-33. Samples with exceedances of screening criteria described in the Foreword to this appendix are summarized in Tables A1-3 through A1-9. Appendix A2 to the SAP presents previous data collected at IR Site 35. Figures and tables follow the text of this appendix.

A1.1 AREA OF CONCERN 1

AOC 1 is a 0.5-acre area near the northwestern boundary of Transfer Parcel Economic Development Conveyance (EDC)-5, and in the south-central portion of EBS Parcel 43 (Figure A1-2). A small portion of Building 3 is in the eastern portion of AOC 1. The remainder of AOC 1 consists of a landscaped area in the south and two paved areas: a "rear kitchen area" in the eastern portion of the AOC, and a loading dock area in the western portion of the AOC (Figure A1-2).

A1.1.1 Historical Use

EBS Parcel 43 (and specifically Building 3) was historically used for housing and barracks. Chemical storage in these residential buildings was minimal, and only minor stains were observed indoors during the EBS. Two grease pits, identified as OWS 063A and OWS 063C in the SWMU Report (SulTech 2005a), are present outdoors in the rear kitchen area portion of Building 3 (Figure A1-2). During an August 2005 site visit by Bechtel Environmental, Inc. (BEI), the locations of these OWSs were identifiable by identical fenced areas; each OWS was covered by sheet metal measuring approximately 5 by 7 feet. According to the SWMU Report, the larger OWS (OWS 063C) measures 16 by 4 by 10 feet deep; the smaller OWS (OWS 063A) measures 12 by 4.5 by 10 feet deep. The grease pits were part of the sanitary sewer system and are not known to have received any hazardous materials. Grease and oil stains, possibly from cooking activities, were observed near the large grease pit during the EBS (IT 2001a).

A third OWS, identified as OWS 063B, was located in AOC 1 and measured 8.5 by 2 by 5 feet deep (SulTech 2005a). OWS 063B was located in the loading dock area and was used to manage runoff from this area. The materials collected in this OWS are unknown. All three OWSs were observed in 2002 to be inactive. Additionally, paint stains were identified on outdoor concrete (in an unspecified location) during the EBS (IT 2001a). No evidence of OWS 063B was found during the August 2005 site visit by BEI.

A1.1.2 Previous Investigations

Three investigations included the collection of samples at AOC 1, and results of these investigations are outlined below. Locations sampled in and around AOC 1 are shown on Figure A1-2. Analytical results for soil samples collected within AOC 1 are summarized in Table A2-1 (included on compact disk [CD] in Appendix A2 to the SAP).

A1.1.2.1 ENVIRONMENTAL BASELINE SURVEY

During the EBS, two surface soil samples (043-0001 and 043-0001M) were collected near OWS 063C in the most heavily stained area and analyzed for total petroleum

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hydrocarbons (TPH). TPH constituents were reported in soil at concentrations below the screening criteria (IT 2001a).

A1.1.2.2 2002 POLYNUCLEAR AROMATIC HYDROCARBON STUDY

One soil boring (32EDC-5-2) was advanced in AOC 1 during the 2002 polynuclear aromatic hydrocarbon (PAH) study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet below ground surface (bgs) and analyzed for PAHs. PAH concentrations in the samples collected did not exceed the soil screening criterion.

A1.1.2.3 SOLID WASTE MANAGEMENT UNIT REPORT

The three OWSs near Building 3 were included in the 2005 SWMU Report (SulTech 2005a). Because no hazardous materials are known to have been received by the two OWSs (063A and 063C) used as grease pits, no further action (NFA) was recommended. However, further action was recommended for the former location of OWS 063B because the materials that were collected in this OWS are unknown, and no sampling has been conducted at this location.

A1.1.3 Proposed Sampling Rationale and Design

The following discussion presents the problem statement and optimized sampling design (DQO Steps 1 and 7) proposed for AOC 1. Sitewide DQOs for the evaluation of OWSs are presented in Table 1-3 in the SAP.

AOC 1 is located entirely in EBS Parcel 43, which was historically used for housing and barracks. Previous investigations did not identify TPH or PAHs in soil at concentrations above screening criteria near Building 3; however, samples were not collected immediately adjacent to the three OWSs (063A, 063B, and 063C), two of which were used as grease pits for the kitchen, and groundwater was not assessed.

Regulatory agencies have requested soil and groundwater sampling at each OWS located in AOC 1 to assess whether soil and groundwater have been impacted by possible releases of contaminants.

Soil and discrete groundwater samples will be collected from one boring adjacent to each OWS; soil samples will be collected at three depth intervals (0 to 2, 2 to 4, and 4 to 8 feet bgs), and groundwater samples will be collected at approximately 10 feet bgs. The proposed sampling locations are shown on Figure A1-2.

Soil and groundwater samples will be analyzed for volatile organic compounds (VOCs) and extractable-range TPH. Groundwater samples will also be analyzed for total dissolved solids (TDS), if sufficient volume can be obtained.

A1.2 AREA OF CONCERN 2

AOC 2 is a 2.9-acre area in the northeastern corner of Transfer Parcel EDC-5 that includes EBS Parcel 194 and a portion of EBS Parcel 61A (Figure A1-3). Buildings 30 and 562 are in the central portion of AOC 2. Naval Air Station (NAS) generator accumulation point (GAP) 28A is in AOC 2; however, its location is uncertain, as

discussed in Section A1.2.2.3. EBS Parcel 61A was included in the 1994 EBS as EBS Parcel 61 (ERM-West 1994a). Subsequent to the completion of the EBS, EBS Parcel 61 was divided into two subparcels: EBS Parcels 61 and 61A.

A1.2.1 Historical Use

EBS Parcel 61A was historically the location of a wheels-up/wave-off landing aid (Building 514), a sewage pump station (Building 562), storage, vehicle parking, open space, and a dog-training and kennel area. Two buildings of unknown use (Building 29 and a portion of Building 103) were also historically present on EBS Parcel 61A. During the EBS (IT 2001a), no chemical storage was observed in the buildings at EBS Parcel 61A; however, undocumented spills were noted on the west side of Building 562. The spills were attributed to the sewage pump station and were reported to have involved a significant volume of unknown material; a stained area measuring approximately 30 by 20 feet was observed.

Numerous items were observed in the open space at EBS Parcel 61A, including two 55-gallon drums (one with unknown contents and the other containing solvent), an open container of solvent with paintbrushes, a gun-cleaning barrel, and cargo containers holding a total of 110 gallons of corrosives, nonhalogenated hydrocarbons, spray paint, dry-cleaning solvents, dispersant and toner, gasoline, paint, and floor polish. Also observed in the open space were additional storage containers, including two 40-foot storage trailers with paint, floor polish, paint thinner, and spray paint and an empty flammable liquid storage cabinet; however, neither the 1994 EBS nor the Parcel Evaluation Plan (PEP) specifies whether these were located in EBS Parcel 61 or 61A (ERM-West 1994a,b).

EBS Parcel 194 historically housed a military police station (Building 30) and two buildings of unknown use (Building 30A and a portion of Building 103). Chemical storage in EBS Parcel 194 included approximately 10 gallons of nonhalogenated organic chemicals and petroleum products that were stored in Building 30. During the EBS, only minor stains associated with vehicle parking were observed in the open space of EBS Parcel 194 (IT 2001a).

A1.2.2 Previous Investigations

Two investigations included the collection of soil samples at AOC 2, and results of these investigations are summarized below. Locations sampled in and around AOC 2 are shown on Figure A1-3. Analytical results for soil samples collected within AOC 2 are summarized in Table A2-2 (included on CD in Appendix A2 to the SAP).

A1.2.2.1 ENVIRONMENTAL BASELINE SURVEY

In EBS Parcel 61A, two soil samples (061-0001 and 061-0002) were collected from the stained area in the open space adjacent to Building 562 (IT 2001a). These soil samples were analyzed for TPH, semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and metals. Analytes reported were below screening criteria. Additionally, six subsurface soil samples (061S-004, -004M, -005, -005M, -006,

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and -006M) were collected at three locations along the sanitary sewer corridor and analyzed for VOCs, TPH, SVOCs, pesticides, PCBs, and metals. Analytes reported were below screening criteria.

No sampling was conducted at EBS Parcel 194 because no potential releases were identified.

A1.2.2.2 2002 POLYNUCLEAR AROMATIC HYDROCARBON STUDY

Two soil borings (32EDC-5-33 and 32EDC-5-34) were advanced in AOC 2 during the 2002 PAH study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. One boring was located in EBS Parcel 61A and the other boring was located in EBS Parcel 194. PAH concentrations exceeded the screening criterion in two samples: one collected from boring 32EDC-5-33 at 4 to 8 feet bgs and one from boring 32EDC-5-34 at 0.5 to 2 feet bgs.

A1.2.2.3 SOLID WASTE MANAGEMENT UNIT REPORT

One SWMU site (NAS GAP 28A) was included in the 2005 SWMU Report (SulTech 2005a). The location of NAS GAP 28A is listed as near Building 562 in the SWMU Report; however, the exact location was not known. This contradicts the location listed in the EBS (adjacent to Building 514). The location of NAS GAP 28A in the ArcView Query Station concurs with the location shown in the SWMU Report (both sources show the location near Building 562). In a letter dated November 4, 1999, the California Environmental Protection Agency Department of Toxic Substances Control (DTSC) recommended NFA for this SWMU.

A1.2.3 Proposed Sampling Rationale and Design

The sampling plan for AOC 2 addresses possible impacts to soil and groundwater from hazardous waste that may have been stored near Building 562, and will assess groundwater quality downgradient of the formerly identified stained area on the western side of Building 562. The following discussion presents the problem statement and optimized sampling design proposed for AOC 2 (DQO Steps 1 and 7). Sitewide DQOs that apply to AOC 2 are presented in Table 1-2 in the SAP.

The open space adjacent to Building 562 was identified as a target area in the EBS due to hazardous materials storage and the presence of stains. EBS samples collected from stained areas on the western and southern side of Building 562 did not identify TPH, metals, pesticides, PCBs, or SVOCs above screening criteria, or at high concentrations when no screening criteria existed. However, the areas around the northern and eastern sides of Building 562 were not targeted for sampling, and groundwater was not assessed.

Additional soil and discrete groundwater samples will be collected around Building 562 to further assess whether soil and/or groundwater has been impacted by releases from possible hazardous waste storage outside the building. Results will also provide information to assess the distribution of PAHs in soil on the eastern portion of the AOC 2 (at two locations that exceeded the screening criterion). These data will be used to

characterize the nature and extent of contamination, conduct a human-health risk assessment (HHRA) for this area, and support a feasibility study (FS).

Soil samples will be collected from four borings outside Building 562; three soil samples will be collected from each boring (0 to 2, 2 to 4, and 4 to 8 feet bgs). Groundwater samples will be collected from the two soil borings located on the assumed downgradient side of the building. Sampling depths and proposed analyses are detailed in Table 1-5 in the SAP. The proposed boring locations are shown on Figure A1-3.

Soil and groundwater samples will be analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. Groundwater samples will also be analyzed for mercury using U.S. EPA Method 1631 to detect concentrations down to 0.1 nanogram per liter (ng/L) and, if sufficient volume can be obtained, for TDS. In addition, two soil samples from one boring at AOC 2 will be submitted for geotechnical analyses. The depths and locations of these geotechnical samples will be determined in the field.

A1.3 AREA OF CONCERN 3

AOC 3 is a 0.4-acre picnic and recreation area near the northwestern corner of Transfer Parcel EDC-5 (Figure A1-4), and in the northeastern corner of EBS Parcel 91. Former Buildings 104 and 416 are entirely in AOC 3; former Building 274 is partially in AOC 3. Currently, there is a structure in the eastern portion of AOC 3 that houses restrooms for the surrounding picnic and recreation areas (not shown on Figure A1-4).

A1.3.1 Historical Use

AOC 3 is entirely in EBS Parcel 91, which was historically used as a golf course, clubhouse and youth center (Building 104), general recreation area, nursery building and lath house (Building 274), and for miscellaneous storage (Building 416) of materials including wood, recreational equipment, broken lawn mowers, and old tires. Two 55-gallon drums containing gasoline and diesel, two cases of motor oil, wood stain, and paint were also observed during EBS investigations. Conex boxes containing fuels and petroleum products, grease, transmission fluid, wood stain, and paint were present in the open space. Severe stains were observed on the metal floors of the Conex boxes during the EBS. Minor stains associated with vehicle parking were also present.

A1.3.2 Previous Investigations

Two previous investigations included the collection of soil samples at AOC 3, and results of these investigations are outlined below. Locations sampled in and around AOC 3 are shown on Figure A1-4. Analytical results for soil samples collected within AOC 3 are summarized in Table A2-3 (included on CD in Appendix A2 to the SAP).

A1.3.2.1 ENVIRONMENTAL BASELINE SURVEY

During the EBS, two surface soil samples (091-0001 and 091-0001RE) were collected from EBS Parcel 91 because of likely historical storage, mixing, or use of pesticides in that area (IT 2001a). The samples were analyzed for pesticides and PCBs. The pesticide

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dieldrin was reported at a concentration above the screening criterion. PCBs were not reported above detection limits.

A1.3.2.2 2002 POLYNUCLEAR AROMATIC HYDROCARBON STUDY

One soil boring (32EDC-5-43) was advanced in AOC 3 during the 2002 PAH study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. PAH concentrations reported in the samples did not exceed the screening criterion.

A1.3.3 Proposed Sampling Rationale and Design

The sampling plan for AOC 3 addresses pesticides identified in soil. The following discussion presents the problem statement and optimized sampling design proposed for AOC 3 (DQO Steps 1 and 7). Sitewide DQOs that apply to AOC 3 are presented in Table 1-2 in the SAP.

The pesticide dieldrin was reported in a soil sample collected during the EBS at a concentration above the screening criterion. However, the extent of pesticide contamination was not determined during that investigation. Therefore, additional soil samples will be collected near the EBS sample to assess the distribution of pesticides in this area. In response to a regulatory agency request, groundwater samples will also be collected and analyzed if pesticides are identified in the deepest soil sample. These data will be used to characterize the nature and extent of contamination, conduct an HHRA for this area, and support an FS.

Soil samples will be collected from six borings around the EBS sampling location; two soil samples will be collected per boring (0 to 2 and 2 to 4 feet bgs); a third soil sample (4 to 8 feet bgs) will be collected from the three borings closest to the original EBS boring location with the elevated pesticide concentration. Locations are targeted outside the footprints of previous buildings because historical pesticide handling and usage would likely have taken place outdoors. Discrete groundwater samples will be collected from the three deepest borings; these samples will be extracted and held by the laboratory pending soil sample results. The proposed sampling locations are shown on Figure A1-4.

All soil and groundwater (if analyzed) samples will be analyzed for pesticides.

A1.4 AREA OF CONCERN 4

AOC 4 is a 4.6-acre area in the northeastern portion of Transfer Parcel EDC-5 (Figure A1-5). AOC 4 includes a portion of the eastern edges of EBS Parcels 62 and 96, the entirety of EBS Parcel 97, and a small portion of the northern edge of EBS Parcel 98.

Current site uses at AOC 4 are described below by EBS parcel:

- EBS Parcel 62 – open space/parking lot
- EBS Parcel 96 – open space/parking lot, paved road

- EBS Parcel 97 – Building 95 (water tank), Building 176 (U.S. Army well with potable water pump station), Building 177 (transformer house), an AST between Buildings 95 and 176, and landscaped open space
- EBS Parcel 98 – landscaped open space, paved road

A1.4.1 Historical Use

Most of AOC 4 is in the portion of Transfer Parcel EDC-5 known as the West Housing Area. Historical uses of AOC 4 are described below by EBS parcel.

- The portion of EBS Parcel 62 located in AOC 4 was formerly used as a parking lot.
- The portion of EBS Parcel 96 located in AOC 4 was formerly used for materials storage, washdown, vehicle parking, and disposal.
- EBS Parcel 97 (located completely in AOC 4) contained a water storage tank (Building 95), a well with a potable-water pump station (Building 176) that was shut down due to mercury contamination, and a transformer house (Building 177) used to store irrigation equipment.
- Only a small portion of EBS Parcel 98 is located in AOC 4; this area was formerly open space (used for material storage, vehicle parking, outdoor repair, drum storage, and recreation).

Minor vehicle parking stains were noted during the EBS in those EBS parcels that include parking areas.

A1.4.2 Previous Investigations

Three investigations were conducted in areas within the boundaries of AOC 4, and results of these investigations are summarized below. Locations sampled in and around AOC 4 are shown on Figure A1-5. Analytical results for soil and groundwater samples collected within AOC 4 are summarized in Tables A2-4 and A2-5, respectively (included on CD in Appendix A2 to the SAP).

A1.4.2.1 BASEWIDE GROUNDWATER MONITORING PROGRAM

A basewide groundwater monitoring program was implemented in 2002 and is ongoing at Alameda Point (Shaw 2004b). The purpose of the program is to inventory, assess, and evaluate the adequacy of the current monitoring well network, as well as to evaluate groundwater quality at Alameda Point. Well MBG-1 is in AOC 4. Soil samples collected from this location during well installation were analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. One soil sample collected at 3 to 3.5 feet bgs during installation of well MBG-1 had concentrations of iron that exceeded the screening criterion (Figure A1-5). While a well at AOC 4 was reported to have been shut down due to mercury contamination, results from these soil samples did not indicate elevated mercury concentrations; reported soil results for mercury were below the screening criterion and detection limits (soil detection limits ranged from 0.077 to 0.104 milligram

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per kilogram [mg/kg] compared to the comparison criterion of 21 mg/kg). Groundwater samples from well MBG-1 were analyzed for VOCs, TPH, SVOCs, pesticides, PCBs, and metals; arsenic was reported in groundwater at a concentration exceeding the screening criterion.

A1.4.2.2 2002 POLYNUCLEAR AROMATIC HYDROCARBON STUDY

Some soil samples collected in AOC 4 during the 2002 PAH study had PAHs at concentrations above the screening criterion. These sample locations were excavated during the PAH time-critical removal action (TCRA), which involved excavation and off-site disposal of the top 2 feet of soil. Therefore, these locations are not shown on Figure A1-5.

Because soil from one boring (2EDC-5-89) advanced in AOC 4 during the 2002 PAH study was not removed during the PAH TCRA, the sampling results appear on Figure A1-5. Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. The soil sample from the 4-to-8-foot interval (beneath the depth to which soil was removed) from boring 2EDC-5-89 had PAH concentrations that exceeded the screening criterion. PAH concentrations in all other soil samples collected at AOC 4 during the 2002 PAH study were below the screening criterion (BEI 2005a).

A1.4.2.3 POLYNUCLEAR AROMATIC HYDROCARBON REMOVAL ACTION

The identification of PAH concentrations above the screening criterion in soil samples collected from Transfer Parcel EDC-5 during the 2002 PAH study (BEI 2005b) prompted the Navy to conduct a TCRA in portions of the West Housing Area (Foster Wheeler 2004). Soil in the upper 2 feet bgs containing PAHs with benzo(a)pyrene (B[a]P) equivalent concentrations greater than 1,000 mg/kg was removed from the West Housing Area in portions of AOC 4, using a grid pattern. Two grid areas (one in portions of EBS Parcels 62 and 96 and the other in portions of EBS Parcels 96 and 97) in AOC 4 underwent TCRA activities (Figure A1-5). Soil samples were collected from 47 borings during TCRA activities in AOC 4 from soil still in place after the removals; these locations are shown on Figure A1-5 (H26-H33, I18-I31, J18-J27, J30-J32, K27-K32, L29-L31, L31RA, M30, and M31). These samples were analyzed for PAHs. PAH concentrations at eight locations deeper than 2 feet bgs (H29-H33, I26, J25, and J26) exceeded the screening criterion.

A1.4.2.4 REMEDIAL INVESTIGATION FOR IR SITE 28

IR Site 28 is located north of AOC 4 and does not share a border with EDC-5 except at the extreme western boundary of IR Site 28. Groundwater contamination (i.e., arsenic, manganese, and nickel) at IR Site 28 is not migrating to EDC-5. Groundwater flow direction at IR Site 28 is toward the Oakland Inner Harbor and away from EDC-5 (BEI 2002).

A1.4.3 Proposed Sampling Rationale and Design

AOC 4 addresses PAHs in soil and metals in soil and groundwater. No sampling is proposed at AOC 4 because the Navy and regulatory agencies agree that there are sufficient existing analytical results. Sitewide DQOs that address the proposed HHRA activities at AOC 4 are presented in Table 1-2 in the SAP.

A1.5 AREA OF CONCERN 5

AOC 5 is a 0.2-acre area along the northeastern boundary of EBS Parcel 98, which is also the northeastern boundary of Transfer Parcel EDC-5. AOC 5 comprises the area surrounding a former sewage pump station located immediately south of the intersection of Ferry and Main Streets. Building 493 is the only structure located in AOC 5; the remainder of AOC 5 is landscaped open space.

A1.5.1 Historical Use

The portion of EBS Parcel 98 located in AOC 5 was historically used as residential and open space and is part of the West Housing Area. Building 493 is a sewage pump station.

A1.5.2 Previous Investigations

Two investigations included the collection of samples at AOC 5. Locations sampled in and around AOC 5 are shown on Figure A1-6. Analytical results for soil samples collected within AOC 5 are summarized in Table A2-6 (included on CD in Appendix A2 to the SAP).

A1.5.2.1 2002 POLYNUCLEAR AROMATIC HYDROCARBON STUDY

Although soil samples collected in AOC 5 during the 2002 PAH study (BEI 2005a) contained PAH concentrations above the screening criterion, these locations were excavated during the PAH TCRA (Foster Wheeler 2004), which involved excavation and off-site disposal of the top 2 feet of soil in several areas. Therefore, these locations are not shown on Figure A1-6.

A1.5.2.2 POLYNUCLEAR AROMATIC HYDROCARBON REMOVAL ACTION

The identification of PAH concentrations above the screening criterion in soil samples collected from Transfer Parcel EDC-5 during the 2002 PAH (BEI 2005b) study prompted the Navy to conduct a TCRA in portions of the West Housing Area (Foster Wheeler 2004). Soil in the upper 2 feet below bgs containing PAHs with B(a)P equivalent concentrations above 1,000 mg/kg was removed from the West Housing Area using a grid pattern at several EBS parcels, including the portion of EBS Parcel 98 that constitutes AOC 5. Two adjacent grid areas in AOC 5 were subject to TCRA activities (Figure A1-6). Soil in the locations where samples were collected from three borings (K12, L11, L12) in AOC 5 during TCRA activities was still in place after the TCRA;

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sample locations are shown on Figure A1-6. These samples were analyzed for PAHs; B(a)P equivalent concentrations were below the screening criterion.

A1.5.3 Proposed Sampling Rationale and Design

The sampling plan for AOC 5 addresses possible releases from a sewage pump station housed in Building 493, which is located in an area historically used for housing. The following discussion presents the problem statement and optimized sampling design proposed for AOC 5 (DQO Steps 1 and 7). Sitewide DQOs that apply to AOC 5 are presented in Table 1-2 in the SAP.

Soil samples collected in AOC 5 during the 2002 PAH study contained PAH concentrations above the screening criteria; soil from this area was removed as part of a PAH TCRA. Although PAH concentrations at AOC 5 have been mitigated, samples were not collected adjacent to the sewage pump station housed in Building 493, and groundwater was not assessed. The regulatory agencies have requested the collection of soil and groundwater samples at AOC 5 to assess whether soil and groundwater have been impacted by possible releases from the sewage pump station. These data will be used to characterize the nature and extent of contamination, conduct an HHRA for this area, and support an FS.

Soil samples will be collected from four borings around the sewage pump station; three soil samples will be collected from each boring (0 to 2, 2 to 4, and 4 to 8 feet bgs). Discrete groundwater samples will be collected from two of the soil borings that will be located on the assumed downgradient side of the sewage pump station. The proposed soil and discrete groundwater sampling locations are shown on Figure A1-6.

Soil and groundwater samples will be analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. Groundwater samples will also be analyzed for TDS, if sufficient volume can be obtained.

A1.6 AREA OF CONCERN 6

AOC 6 is a 0.2-acre area in the north-central portion of Transfer Parcel EDC-5 (Figure A1-7), and consists of a parking area and grassy open spaces where buildings were formerly located. AOC 6 is an area that was subject to a PCB removal, after which no confirmation soil samples were collected. Information on the exact location, area, and depth of excavation, and the volume of removed soil, is not available. There was no visible evidence of the removal action at AOC 6 during a site visit by BEI in August 2005.

A1.6.1 Historical Use

AOC 6 is completely in EBS Parcel 87, immediately southwest of the intersection of Seattle Road and Pan Am Way. Historical uses of EBS Parcel 87 included officers' quarters and housing (Building 85, demolished in 1968), an electrical substation (Building 553, still present and maintained by Alameda Power and Telecom), and a parking lot. Stains associated with vehicle parking are present in the parking area

(BEI 2005b). A portion of Building 85 was formerly located in AOC 6; Building 553 is entirely in AOC 6. The EBS reported that a transformer located on a fenced pad adjacent to the west side of Building 553 ruptured in 1986 due to overheating. An unknown quantity of oil containing PCBs sprayed from the transformer approximately 15 feet to the west onto grass, trees, and fencing (IT 2001a). Cleanup was performed and contaminated material was removed; however, no confirmation samples were collected. The area and depth of the excavation are unknown.

A1.6.2 Previous Investigation

The PAH TCRA was the only investigation that included the sampling and analysis of soil at AOC 6 (Foster Wheeler 2004). The PAH TCRA included the collection of nine soil samples at two locations in AOC 6. No PAH removals were conducted at EBS Parcel 87 or AOC 6; however, four soil borings (U33, U34, V33, and V34) were advanced in AOC 6 as part of the TCRA activities. Samples were collected from these borings at four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. Soil samples collected at 2 to 4 feet bgs from borings U33 and U34, and one other location (W32) near AOC 6 contained PAH concentrations exceeding the screening criterion. Locations sampled in and around AOC 6 are shown on Figure A1-7.

A1.6.3 Proposed Sampling Rationale and Design

The sampling plan for AOC 6 addresses possible PCBs in soil. Although PAH concentrations exceeded screening criteria at locations near AOC 6, an adequate number of samples already exist to support the RI/FS for this area; therefore, no further samples are proposed for PAH analysis. The following discussion presents the problem statement and optimized sampling design proposed for AOC 6 (DQO Steps 1 and 7). Sitewide DQOs that apply to AOC 6 are presented in Table 1-2 in the SAP.

PCB-containing oil sprayed out approximately 15 feet towards the west from an electrical substation at AOC 6. Although cleanup was performed and contaminated material was removed (the substation pad was removed by 1990), no confirmation samples were collected. Therefore, soil samples will be collected from six borings west of Building 553 to assess whether PCBs remain in soil at concentrations above screening criteria. These data will be used to characterize the nature and extent of contamination, conduct an HHRA for this area, and support an FS.

Soil samples will be collected from six borings west of Building 553; two soil samples will be collected from each boring (0 to 2 and 2 to 4 feet bgs). The proposed soil sampling locations are shown on Figure A1-7. Soil samples will be analyzed for PCBs.

A1.7 AREA OF CONCERN 7

AOC 7 is a 0.9-acre area in the central portion of Transfer Parcel EDC-5 (Figure A1-8), and in the southwestern portion of EBS Parcel 98 just southeast of the intersection of Pan Am Way and Pensacola Lane. AOC 7 contains portions of Buildings FH-9 and FH-12, and all of Buildings FH-10, FH-11, and FH-278. Buildings FH-9, FH-10, FH-11, and FH-12 are currently occupied by tenants; Building FH-278 is a high-voltage

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electrical substation. AOC 7 also includes open space that is either landscaped or paved for vehicle parking.

A1.7.1 Historical Use

The portion of Parcel 98 covered by AOC 7 may have historically been used as a location for family housing, temporary barracks, and open space for vehicle parking, storage activities associated with maintenance operations, drum storage, and recreation. It is not known which of these outdoor activities occurred specifically in AOC 7.

A1.7.2 Previous Investigations

Two investigations were conducted at AOC 7, and results of the investigations are summarized below. Locations sampled in and around AOC 7 are shown on Figure A1-8. Analytical results for soil samples collected within AOC 7 are summarized in Table A2-8 (included on CD in Appendix A2 to the SAP).

A1.7.2.1 OPERABLE UNIT 5 ADDENDUM

Samples were collected in Transfer Parcel EDC-5 as part of the OU-5 Addendum activities conducted in 2001 in support of the OU-5 RI (IT 2001b). Twenty-four soil samples were collected from six locations in the transfer parcel; one of these borings (098-010) was located in AOC 7. Samples were collected from this boring at depth intervals between 2 and 8 feet bgs and analyzed for PAHs. Soil collected from the boring at 6 to 8 feet bgs had reported PAH concentrations above the screening criterion.

A1.7.2.2 POLYNUCLEAR AROMATIC HYDROCARBON REMOVAL ACTION

PAH TCRA soil removals in the West Housing Area were conducted using a grid pattern at several EBS parcels, including an area of EBS Parcel 98 in AOC 7 (Foster Wheeler 2004). Twelve soil borings were advanced in AOC 7 (BB27-30, CC27-30, and DD27-30). Soil samples collected from these borings were analyzed for one or more of the following analytes: PAHs, pesticides, PCBs, and metals. Only results from soil samples collected at depths not excavated during the PAH TCRA were reviewed for this report.

Soil collected at 1 to 2 feet bgs from borings BB30 and CC27 had reported concentrations of PAHs that exceeded the screening criterion. Aroclor 1254 concentrations in soil from these borings also exceeded the screening criterion.

A1.7.3 Proposed Sampling Rationale and Design

AOC 7 was established to address reported PAH and PCB concentrations in soil. Because sufficient data exist to support an HHRA, no further sampling is proposed for AOC 7, as agreed upon in discussions at a working meeting between the Navy and regulatory agencies in May 2005. Sitewide DQOs that address the proposed HHRA activities are presented in Table 1-2 in the SAP.

A1.8 AREA OF CONCERN 8

AOC 8 is a 0.5-acre area in the central portion of Transfer Parcel EDC-5, near Pensacola Lane and Corpus Christi Road, in the northeastern portion of EBS Parcel 98. Building 550, a sheet metal shed, is the only structure located in AOC 8; the remainder of the AOC is open space and is the location of the Alameda Point Garden.

A1.8.1 Historical Use

The portion of EBS Parcel 98 located in AOC 8 was historically open space and is in the West Housing Area. Building 550 was part of a larger landscape maintenance facility in the West Housing Area. The landscape maintenance facility is a fenced area that formerly contained three large sheds (one wooden and two aluminum) and two buildings, Building 550 and Building 195 (located immediately south of AOC 8). Building 550 was used for grounds maintenance; Building 195 was used as a pesticide and fertilizer storage shed where small batches of pesticides and fertilizers were mixed. Oil, fuel, pesticides, herbicides, and fertilizers were stored in the maintenance facility, both indoors and in the surrounding open space.

During the EBS, stains were observed on bare earth in Building 195 (IT 2001a). Various other stains (some with strong hydrocarbon odors) were observed in open space surrounding Building 550. Hazardous wastes, including an abandoned 55-gallon drum covered with oil and a 30-gallon drum of waste oil, were also observed near the maintenance facility. In the remaining open space areas, only minor stains related to vehicle parking were observed.

A1.8.2 Previous Investigations

Three investigations included the collection of samples at AOC 8, and results from these sampling activities are discussed in the following subsections. Locations sampled in and around AOC 8 are shown on Figure A1-9. Analytical results for soil samples collected within AOC 8 are summarized in Table A2-9 (included on CD in Appendix A2 to the SAP).

A1.8.2.1 ENVIRONMENTAL BASELINE SURVEY

Two portions of the landscape maintenance facility were investigated during the EBS: one in AOC 8 and the other near former Building 195, immediately south of AOC 8 (IT 2001a).

The area around Building 550 in AOC 8 was investigated to address the storage and use of potentially hazardous substances; stains were observed in the fenced area of the landscape maintenance facility. Initially, four soil samples (098-0004, -0005, -0006, and -0006RE) were collected from 0 to 1 foot bgs and analyzed for TPH, pesticides, and PCBs. Aroclor 1254 was reported at concentrations above the screening criterion in sample 098-0006, collected at 0.5 to 1 foot bgs. Three additional samples (098-0034, -0035, and -0041) were collected in AOC 8 between 0 and 4 feet bgs to further delineate

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the extent of PCB contamination. The samples were analyzed for TPH, pesticides, and PCBs. No analytes were reported at concentrations above screening criteria.

A1.8.2.2 2002 POLYNUCLEAR AROMATIC HYDROCARBON STUDY

One soil boring (32EDC-5-196) was advanced in AOC 8 during the 2002 PAH study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. All PAH concentrations were below the screening criterion.

A1.8.2.3 POLYNUCLEAR AROMATIC HYDROCARBON REMOVAL ACTION

PAH TCRA soil removals in the West Housing Area were conducted using a grid pattern at several EBS parcels, but no removals were performed at AOC 8 (Figure A1-9). However, eight soil borings (AA21, AA21RA, AA21RB, AA23, BB21, BB22RA, CC21, and CC22) were advanced in AOC 8 as part of the PAH TCRA activities (Foster Wheeler 2004). Samples were collected from these borings at four depth intervals between 0 and 8 feet bgs and were analyzed for PAHs. None of the soil samples collected from these eight borings exceeded the PAH screening criterion.

A1.8.2.4 RELEVANT INVESTIGATIONS AT ADJACENT SITES

Due to the elevated concentrations of pesticides and PCBs reported near Building 195 (immediately south of AOC 8) during the EBS, former Building 195 and surrounding soil were removed as part of a one-time pesticide TCRA completed in February 2004 (Shaw 2004a). In addition, elevated concentrations of lead associated with lead-based paint (LBP) were identified in the surrounding soil at Building 195. Based on the analytical results and the potential for these contaminants to pose a threat to human health, a TCRA was conducted. Between February and March 2002, 203 cubic yards of soil was removed (from a maximum depth of 2 feet bgs). The results of confirmation sampling indicated that PCBs and lead were present at concentrations below their respective cleanup levels and that pesticides were not reported at concentrations above detection limits. As a result, no additional action was recommended in the vicinity of Building 195. The cleanup levels used during the TCRA were United States Environmental Protection Agency (U.S. EPA) 2002 preliminary remediation goals (PRGs) (U.S. EPA 2002) for residential soil for pesticides and PCBs, and 209 mg/kg for lead (derived using a site-specific application of the DTSC Lead Risk Assessment Spreadsheet Version 7 [LeadSpread 7] model).

A1.8.3 Proposed Sampling Rationale and Design

The sampling plan for AOC 8 addresses PCBs in soil. The following discussion presents the problem statement and optimized sampling design proposed for AOC 8 (DQO Steps 1 and 7). Sitewide DQOs that apply to AOC 8 are presented in Table 1-2 in the SAP.

A PCB (Aroclor 1254) was reported above the screening criterion in soil collected during the EBS. The extent of contamination was defined southeast of EBS sample 098-0006, but not in the other directions. Therefore, additional soil samples will be collected to assess the distribution of PCBs around the location of EBS sample 098-0006. These data

will be used to characterize the nature and extent of contamination, conduct an HHRA for this area, and support an FS.

Soil samples will be collected from five borings around the location of EBS sample 098-0006; two soil samples will be collected from each boring (0 to 2 and 2 to 4 feet bgs). The proposed sampling locations are shown on Figure A1-9.

Soil samples will be analyzed for PCBs.

A1.9 AREA OF CONCERN 9

AOC 9 is a 0.3-acre area in the west-central portion of Transfer Parcel EDC-5 (northeast of the intersection of Todd Street and West Midway Avenue) (Figure A1-10). Most of AOC 9 is in EBS Parcel 80, with a small portion on the western edge located in EBS Parcel 81. AOC 9 currently consists of a portion of the landscaped area around Building 117 and the entire width of West Midway Avenue located east of Todd Street. AOC 9 is adjacent to the northeastern boundary of IR Site 8, an area of known contamination from pesticides, metals, and PAHs in soil, and benzene and chlorinated hydrocarbons in groundwater.

A1.9.1 Historical Use

EBS Parcel 80 was historically used for officers' quarters and housing, including a mess hall and school (Building 17), and open space for vehicle parking, gardening, and composting. Household cleaning products were stored in small quantities in the building. A grease trap was located immediately outside the southwestern corner of the building. A grease drum, an oil drip pan, and a 1-quart oil container were observed during the EBS (IT 2001a). However, no visible evidence of the grease trap or related items was observed during an August 2005 site visit by BEI. The portion of EBS Parcel 81 located in AOC 9 was historically open space.

A1.9.2 Previous Investigation

One investigation involving the collection of samples was conducted in AOC 9: the PAH removal action (Foster Wheeler 2004). Locations sampled in and around AOC 9 are shown on Figure A1-10. Analytical results for soil samples collected within AOC 9 are summarized in Table A2-10 (included on CD in Appendix A2 to the SAP).

Soil removals in the West Housing Area were conducted using a grid pattern at several EBS parcels, including an area of EBS Parcel 80 (located in AOC 9) (Figure A1-10). Additionally, three soil borings (EE46, FF45, and FF46) were advanced in AOC 9 as part of the TCRA activities. Samples were collected from these borings at four depth intervals between 0 and 8 feet bgs and analyzed for SVOCs. Selected samples from boring FF46 were also analyzed for Aroclors and arsenic. No analytes were reported at concentrations above screening criteria.

A1.9.3 Proposed Sampling Rationale and Design

The sampling plan for AOC 9 responds to a request by regulatory agencies to further assess whether pesticides are present in soil due to the area's proximity to IR Site 8 and to evaluate potential contaminants from a grease trap formerly located in AOC 9. The following discussion presents the problem statement and optimized sampling design proposed for AOC 9 (DQO Steps 1 and 7). Sitewide DQOs that apply to AOC 9 are presented in Table 1-2 in the SAP.

Soil samples will be collected at AOC 9 in order to 1) assess the presence of pesticides at AOC 9 near the border of IR Site 8, and 2) evaluate possible historical releases from the grease trap. In addition, a discrete groundwater sample will be collected to assess whether possible releases from the grease trap impacted groundwater. These data will be used to characterize the nature and extent of contamination, conduct an HHRA for this area, and support an FS.

Soil samples will be collected from four borings at AOC 9; three soil samples will be collected from each boring (0 to 2, 2 to 4, and 4 to 8 feet bgs). A discrete groundwater sample will also be collected from the soil boring on the assumed downgradient side of the grease trap. The proposed soil and discrete groundwater sampling locations are shown on Figure A1-10.

Soil samples will be analyzed for pesticides. The deeper two soil samples from the boring next to the grease trap will also be analyzed for extractable-range TPH. Groundwater samples will be analyzed for extractable-range TPH and, if sufficient volume can be obtained, for TDS.

A1.10 AREA OF CONCERN 10

AOC 10 is a 2-acre area in the central portion of Transfer Parcel EDC-5 (Figure A1-11), and along the west-central edge of EBS Parcel 98. The two buildings (FH-23 and FH-24) located on-site are currently occupied by tenants. A radio antenna tower (Structure 036B) was also historically located on-site.

A1.10.1 Historical Use

Prior to its removal in December 1995, the radio antenna tower had been used as a communications antenna since its construction in 1953. The footings for the tower were removed in October 2001. The portion of EBS Parcel 98 located in AOC 10 is in the West Housing Area. The two on-site buildings were used for housing.

A1.10.2 Previous Investigations

Two investigations were conducted at AOC 10, and results of these investigations are summarized below. Locations sampled in and around AOC 10 are shown on Figure A1-11. Analytical results for soil samples collected within AOC 10 are summarized in Table A2-11 (included on CD in Appendix A2 to the SAP).

A1.10.2.1 2002 POLYNUCLEAR AROMATIC HYDROCARBON STUDY

One soil boring (32EDC-5-84) was advanced in AOC 10 during the 2002 PAH study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. Concentrations of all soil samples from this boring were below the screening criterion.

A1.10.2.2 LEAD REMOVAL ACTION

Based on potential historical use of LBP and on the elevated lead concentrations reported in soil samples collected around the two water towers located near AOC 10, an investigation was conducted to assess the extent of lead contamination surrounding other structures, including the radio antenna tower (Structure 036B) located in AOC 10 (TtEMI 2002b).

Soil samples were collected from several locations around the radio antenna tower (Structure 36B) in AOC 10. Results of 18 samples collected from soil not removed during subsequent removal actions (see next paragraph) are shown on Figure A1-11 (SS-36B-C00, -E25, -E50, -E75, -N25, -N50, -N75, -NE50, -NE75, -NW50, -NE75, -S25, -SE25, -SE50, -SW25, -W25, -W50, and -W75). Samples from eight locations (SS-36B-N25, -N75, -NW75, -S25, -SE50, -SW25, -W50, and -W75) had lead concentrations reported above the lead screening criterion; however, as discussed below, only five samples contained lead at concentrations above the removal action objective (RAO).

An engineering evaluation/cost analysis (EE/CA) was completed in 2002 (TtEMI 2002b). The EE/CA presented a framework for evaluating the best remedial technologies to address LBP on the antenna tower in AOC 10 and lead-impacted soil near the structure. During the EE/CA, a site-specific human-health RAO was developed for lead using the DTSC LeadSpread 7 model. This RAO (199 mg/kg) was compared to the reported concentrations of lead; concentrations of lead in five samples (SS-36B-S25, -SE50, -SW25, -W50, and -W75) from AOC 10 exceeded the RAO.

A lead non-time-critical removal action (NTCRA) was conducted by the Navy between November 2002 and July 2003 (Shaw 2003). During this NTCRA, soil was removed to 1 to 2 feet bgs in AOC 10. Confirmation soil samples collected near former Structure 36B are labeled in the format "Parcel 98 Grid ##." Soil samples were analyzed for lead, total chromium, and hexavalent chromium. One of these confirmation soil samples (Parcel 98 Grid 28) had lead concentrations reported above screening criteria; however, the concentration did not exceed the site-specific RAO.

Results of the confirmation sampling conducted as part of the NTCRA indicated that the metals concentrations were below the RAO calculated for lead. However, analytical results for soil samples collected on the south side of the excavation during previous sampling indicate the presence of lead at concentrations above the RAO (Figure A1-11). The soil containing these elevated lead concentrations was not removed due to the presence of hardscape cover in these areas. Soil sample locations are shown on

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Figure A1-11. Post-removal action analytical results are summarized in Table A2-11 (included on CD in Appendix A2 to the SAP).

A1.10.3 Proposed Sampling Rationale and Design

The sampling plan for AOC 10 addresses the remaining lead concentrations in soil outside the area that was subject to a lead removal. The following discussion presents the problem statement and optimized sampling design proposed for AOC 10 (DQO Steps 1 and 7). Sitewide DQOs that apply to AOC 10 are presented in Table 1-2 in the SAP.

Locations with lead reported at concentrations exceeding the RAO are situated along the southern perimeter of the excavation area; these locations were not excavated due to hardscape cover in these areas. Therefore, additional soil samples will be collected at AOC 10 to assess the extent of lead outside the excavation area. These data will be used to characterize the nature and extent of contamination, conduct an HHRA for this area, and support an FS.

Soil samples will be collected from five borings at AOC 10; three soil samples will be collected from each boring (0 to 2, 2 to 4, and 4 to 8 feet bgs). The proposed soil sampling locations are shown on Figure A1-11. All soil samples will be analyzed for lead.

A1.11 AREA OF CONCERN 11

AOC 11 is a 2-acre area in the west-central portion of Transfer Parcel EDC-5 (Figure A1-12) and has boundaries identical to those of EBS Parcel 77. AOC 11 currently consists of the concrete foundation of former Building 101, landscaped open space, and paved vehicle parking. The open space covers approximately 40 percent of AOC 11; Building 101 covers the remaining 60 percent. During the EBS inspection, splatter marks from unknown substances were observed in and around the deep sink in Building 101, and various stains were also observed; the location of the deep sink could not be identified during an August 2005 site visit by BEI. One gallon of hydraulic fluid was stored in a Conex box located in the open space (IT 2001a). AOC 11 is located immediately east of IR Site 8 (an area of known contamination from pesticides, metals, and PAHs in soil, and benzene and chlorinated hydrocarbons in groundwater).

A1.11.1 Historical Use

Building 101 at EBS Parcel 77 was historically used as a heating plant and for public works maintenance storage, administration, and academic instruction. Past uses may also have included ammunition storage (IT 2001a). General cleaning supplies, oil, and hazardous waste were stored in the building. Historic activities conducted in the open space included material storage, equipment parking, training, and vehicle parking (IT 2001a).

A1.11.2 Previous Investigations

Two investigations were conducted at AOC 11, and results of these investigations are summarized below. Locations sampled during previous investigations in and around AOC 11 are shown on Figure A1-12. Analytical results for soil and groundwater samples collected within AOC 11 are summarized in Tables A2-12 and A2-13, respectively (included on CD in Appendix A2 to the SAP).

A1.11.2.1 OPERABLE UNIT 1 REMEDIAL INVESTIGATION REPORT

One groundwater sample (S08-HP-06) collected along the western boundary of AOC 11 as part of the follow-on sampling conducted at IR Site 8 in 1998 for the OU-1 RI Report was analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX). These VOCs in the groundwater sample were reported at concentrations below the screening criteria (TtEMI 2002c).

A1.11.2.2 2002 POLYNUCLEAR AROMATIC HYDROCARBON STUDY

One soil boring (32EDC-5-57) was advanced in AOC 11 during the 2002 PAH study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. Concentrations of PAHs were below the screening criterion.

A1.11.3 Proposed Sampling Rationale and Design

The sampling plan for AOC 11 addresses chemical storage at EBS Parcel 77 and stains observed at Building 101 during the EBS. The following discussion presents the problem statement and optimized sampling design proposed for AOC 11 (DQO Steps 1 and 7). Sitewide DQOs that apply to AOC 11 are presented in Table 1-2 in the SAP.

Limited sampling has been performed in AOC 11. Therefore, soil and discrete groundwater samples will be collected beneath and around Building 101 to assess whether contaminants from site activities impacted soil and groundwater. One boring will be advanced in the northwest corner of AOC 11, near the boundary of IR Site 8, to evaluate pesticides associated with that site. These data will be used to characterize the nature and extent of contamination, conduct an HHRA for this area, and support an FS.

Soil samples will be collected from four borings at AOC 11; three soil samples will be collected from each boring (0 to 2, 2 to 4, and 4 to 8 feet bgs). Discrete groundwater samples will be collected from the two most downgradient soil borings. The proposed sampling locations are shown on Figure A1-12.

Soil and groundwater samples will be analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. Groundwater samples will also be analyzed for TDS, if sufficient volume can be obtained. In addition, two soil samples will be collected from one boring at AOC 11 and submitted for geotechnical analysis. The depths and locations of these geotechnical samples will be determined in the field.

A1.12 AREA OF CONCERN 12

AOC 12 is a 0.86-acre area in the central portion of Transfer Parcel EDC-5 near the intersection of Moonlight Terrace and West Ranger Avenue (Figure A1-13). The northern portion of AOC 12 consists of portions of EBS Parcels 105, 106, and 107 and was formerly occupied by one 200,000-gallon water tower (Structure 33). This area currently consists of grassy open space and paved areas. A small rectangular fenced area (10 by 15 feet) in the grassy open space encloses a rectangular slab of concrete with a metal cover just west of the location of former Structure 33. Another rectangular concrete structure with a metal cover is located in an unfenced area south of former Structure 33. Approximately 100 gallons of paint, solvents, and lubricants were observed to be stored in the open space area during the EBS in 1994 (it is not known if this was within the boundaries of AOC 12) (ERM-West 1994a). The southern portion of AOC 12 is in a portion of EBS Parcel 107 and consists of open space. A second water tower of unknown size was historically located in this area (Structure 61); however, no evidence of that structure currently exists. Old railroad tracks run north-south through the middle of AOC 12.

A1.12.1 Historical Use

The northern portion of AOC 12 is open space that was historically used for vehicle parking and also contained sidewalks and landscaping. The water towers in both the northern and southern areas (Structures 33 and 61, respectively) were used for storing water. The water tank (Structure 61) in the southern portion of AOC 12 was removed in January 1994; however, there is no visual evidence of its location. The water tank (Structure 33) in the northern portion of AOC 12, including its concrete footings, was removed in December 2002 (Shaw 2003).

A1.12.2 Previous Investigations

Two investigations were conducted at AOC 12, and results of these investigations are summarized below. Locations sampled during previous investigations in and around AOC 12 are shown on Figure A1-13. Analytical results for soil samples collected within AOC 12 are summarized in Table A2-14 (included on CD in Appendix A2 to the SAP).

A1.12.2.1 ENVIRONMENTAL BASELINE SURVEY

Two soil samples (107-0001 and 107-0002) were collected during the EBS to investigate potential contamination associated with the railroad tracks (IT 2001a). These samples were analyzed for SVOCs, pesticides, PCBs, TPH, and metals. Reported metals concentrations (iron, thallium, vanadium) exceeded the screening criteria in both samples.

Two soil samples (108S-001M and 108S-001) were collected to evaluate the sanitary sewer. Soil sample 108S-001M was analyzed for TPH and metals; soil sample 108S-001 was analyzed for SVOCs, pesticides, and PCBs. Reported analyte concentrations in these soil samples were below the screening criteria.

A1.12.2.2 LEAD REMOVAL ACTION

Based on potential historical use of LBP and elevated lead concentrations in soil samples collected near the locations of the two water towers, an investigation was conducted to determine the extent of lead contamination surrounding a number of structures, including the water towers (Structures 33 and 61) located in AOC 12 (TtEMI 2002b).

Soil samples were collected from a number of locations around each of the former water towers in AOC 12. Samples that were not removed during subsequent removal actions (see next paragraph) are shown on Figure A1-13 (17 locations near former Structure 61: SS-61-C00, -E25, -E50, -N25, -N50, -NE25, -NE50, -NW25, -NW50, -NW75, -S25, -SE50, -SW25, -SW50, -W25, -W50, and -W75; and 5 locations near former Structure 33: SS-33-E50, -NW50, -S50, -SE50, and -SW50). Samples from all of these locations except SS-33-E50 at former Structure 33 had lead concentrations above screening criteria. Samples from all but seven of these locations around former Structure 61 had lead concentrations above screening criteria (exceedances at SS-61-C00, -E25, -N50, -NE50, -NW50, -W25, and -W75).

An EE/CA was completed in 2002 (TtEMI 2002b). The EE/CA presented a framework for evaluating the best remedial technologies to address LBP on the water towers in AOC 12 and lead-impacted soil near the structures. During the EE/CA, a site-specific human-health RAO was developed for lead using the DTSC LeadSpread 7 model. The RAO of 199 mg/kg was compared to the reported concentrations of lead.

A lead NTCRA was conducted by the Navy between November 2002 and July 2003 (Shaw 2003). During this NTCRA, soil was removed to 2 to 3 feet bgs around former Structure 33 in the northern portion of AOC 12 and to 1 to 2 feet bgs around former Structure 61 in the southern portion of AOC 12. Three smaller areas were also excavated adjacent to but outside of AOC 12 at EBS Parcel 105. Confirmation soil borings advanced around former Structure 61 are labeled in the format "Grid ## Tower 61" and confirmation soil borings advanced around former Structure 33 are labeled in the format "Parcel 106 Grid ##." Soil samples were analyzed for metals; selected samples were also analyzed for VOCs, SVOCs, TPH, pesticides, and PCBs.

The results of the confirmation sampling conducted as part of the NTCRA indicated that most of the metals concentrations were below the RAO calculated for lead, except for lead concentrations in two confirmation sampling locations in the former Structure 61 excavation (Grid 6 Tower 61 and Grid 7 Tower 61). However, analytical results for previous soil samples collected outside of the excavations at Structures 33 and 61, and outside of two smaller excavations at EBS Parcel 105, indicate the presence of lead at concentrations above the RAO. Soil with these elevated lead concentrations was not removed due to the presence of hardscape cover in these areas. Specifically, soil with lead concentrations above the RAO was not removed from the following locations:

- four locations around the former Structure 61 excavation (SS-61-W75, -NW50, -N50, and -NE50)
- one location of EBS samples around the former Structure 61 excavation (EBS samples 107-0001 and 107-0002)

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- three locations around the former Structure 33 excavation (SS-33-S50, SS-33-SE50, and SS-33-SW50)
- two locations around smaller excavations at EBS Parcel 105 (SS-105-A1 and SS-105-C1)

Soil sample locations are shown on Figure A1-13. Post-removal action analytical results are summarized on Table A2-14 (included on CD in Appendix A2 to the SAP).

A1.12.3 Proposed Sampling Rationale and Design

The sampling plan for AOC 12 addresses the remaining lead concentrations in soil outside the areas that were subject to the lead NTCRA. The following discussion presents the problem statement and optimized sampling design proposed for AOC 12 (DQO Steps 1 and 7). Sitewide DQOs that apply to AOC 12 are presented in Table 1-2 in the SAP.

Soil from locations with lead at concentrations exceeding the site-specific RAO of 199 mg/kg was not removed during the excavations due to hardscape cover in these areas. Therefore, soil samples will be collected in these areas to assess the extent of lead in soil beneath the hardscape. These data will be used to characterize the nature and extent of contamination, conduct an HHRA for this area, and support an FS.

Soil samples will be collected (using the direct-push sampling method) from 14 borings at AOC 12; three soil samples will be collected from each boring (0 to 2, 2 to 4, and 4 to 8 feet bgs). The proposed soil sampling locations are shown on Figure A1-13.

In response to a comment on the draft Work Plan, two sediment samples will be collected to assess whether paint chips containing lead may have been released to the stormwater collection system during the lead NTCRA performed in this area. One sample will be collected from a catch basin at Parcel 106 south of the Parcel 106 water tower removal area, and a second sample will be collected from either a catch basin or storm sewer between AOC 12 and Sea Plane Lagoon.

All soil and sediment samples will be analyzed for lead.

A1.13 AREA OF CONCERN 13

AOC 13 is a 1.15-acre area in the central portion of Transfer Parcel EDC-5 near the intersection of Stardust Place and Rainbow Court (Figure A1-14), and is along the western edge of EBS Parcel 103. The portion of EBS Parcel 103 included in AOC 13 contains most of family housing Building FH-813, all of FH-816, the southwestern tip of FH-814, and landscaped open space that is used for vehicle parking and recreation. FH-816 is currently occupied by tenants; FH-813 and FH-814 are unoccupied.

A1.13.1 Historical Use

EBS Parcel 103 was historically used for barracks, public works storage, insect vector control, ready-issue storage, applied instruction, a combat training pool, and as a playing field. It is not known which of these uses occurred within the boundaries of AOC 13.

Buildings housing these historical activities were demolished in 1960, and the family housing units currently present on the site were constructed after that time.

A1.13.2 Previous Investigations

Two investigations were conducted at AOC 13, and results of these investigations are summarized below. Locations sampled during previous investigations in and around AOC 13 are shown on Figure A1-14. Analytical results for soil samples collected within AOC 13 are summarized in Table A2-15 (included on CD in Appendix A2 to the SAP).

A1.13.2.1 ENVIRONMENTAL BASELINE SURVEY

Ten soil samples (103-0001, -0002, -0019, -0020, -0021, -0022, -0023, -0024, -0031, and -0032) were collected during the EBS for analysis for pesticides and PCBs; one additional sample (103S-002M) was collected to investigate the sanitary sewer and was analyzed for TPH (IT 2001a). Reported concentrations of pesticides (4,4'-dichlorodiphenyltrichloroethane [DDT], 4,4'-dichlorodiphenyldichloroethane [DDD], and/or dieldrin) exceeded the screening criteria in three samples (103-0002, -0020, and -0023).

A1.13.2.2 POLYNUCLEAR AROMATIC HYDROCARBON REMOVAL ACTION

The identification of PAHs at concentrations above the screening criterion in soil samples collected from Transfer Parcel EDC-5 during the 2002 PAH study prompted the Navy to conduct a TCRA in portions of the West Housing Area (Foster Wheeler 2004). Soil in the upper 2 feet below bgs with B(a)P equivalent concentrations greater than 1,000 mg/kg was removed in the West Housing Area using a grid pattern at several EBS parcels, including an area of AOC 13 (Figure A1-14). Approximately one-half of one removal area is located along the eastern edge of AOC 13. Thirteen soil borings (PP24B, QQ25, RR21, RR22, RR23, RR24, RR25, SS21, SS22, SS23, SS24, TT22, and TT23) were advanced in AOC 13 as part of the removal action activities. Samples were collected from these borings at depths between 0 and 8 feet bgs and were analyzed primarily for PAHs. Samples from one boring (SS21) were also analyzed for pesticides, PCBs, and arsenic. Only results from soil samples collected at depths not excavated during the removal action were reviewed for this Work Plan.

Soil from boring QQ25 at a depth of 0.5 to 2 feet bgs had reported PAH concentrations that exceeded the soil screening criterion (BEI 2005a). Concentrations of all other analytes were below the screening criteria in all samples.

A1.13.3 Proposed Sampling Rationale and Design

AOC 13 addresses concentrations of pesticides identified in the EBS that exceed comparison criteria in three samples (103-0002, -0020, and -0023). The following discussion presents the problem statement and optimized sampling design proposed for AOC 13 (DQO Steps 1 and 7). Sitewide DQOs that apply to AOC 13 are presented in Table 1-2 in the SAP.

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The extent of pesticides in the three EBS soil samples was not determined during the EBS. Additionally, soil from boring QQ25 had reported PAH concentrations that exceeded the soil screening criterion (BEI 2005a); this location is near the location of EBS sample 103-0002. Additional soil samples will be collected near these samples to assess the distribution of pesticides. One of these borings will also be used to assess the distribution of PAHs near boring QQ25. These data will be used to characterize the nature and extent of contamination, conduct an HHRA for this area, and support an FS.

Soil samples will be collected from seven borings around EBS samples 103-0002, 103-0020, 103-0023, and QQ25; two soil samples will be collected from each boring (0 to 2 and 2 to 4 feet bgs). Soil sampling locations are shown on Figure A1-14.

Soil samples will be analyzed for pesticides. Soil samples collected south of sampling location QQ25 will also be analyzed for PAHs.

A1.14 AREA OF CONCERN 14

AOC 14 is a 1.6-acre area in the east-central portion of Transfer Parcel EDC-5, along Norfolk Road between Stardust Place and West Tower Avenue (Figure A1-15), and is in the southern central portion of EBS Parcel 103. AOC 14 contains Buildings FH-825 and FH-826 and portions of Buildings FH-824, FH-828, and FH-829. AOC 14 also contains open space that is either paved for vehicle parking or landscaped.

A1.14.1 Historical Use

The portion of EBS Parcel 103 designated as AOC 14 was historically the location of apartments and family housing with open space for vehicle parking and recreation.

A1.14.2 Previous Investigations

Three investigations were conducted at AOC 14, and results of these investigations are summarized below. Locations sampled during previous investigations in and around AOC 14 are shown on Figure A1-15. Analytical results for soil samples collected within AOC 14 are summarized in Table A2-16 (included on CD in Appendix A2 to the SAP).

A1.14.2.1 OPERABLE UNIT 5 ADDENDUM

Samples were collected in Transfer Parcel EDC-5 as part of the OU-5 Addendum activities conducted in 2001 in support of the OU-5 RI (IT 2001b). Soil samples were collected from one location (103-018) in AOC 14. Soil samples were collected from this boring from depths between 0 and 8 feet bgs and analyzed for PAHs. Soil collected from the depth interval between 6 to 8 feet bgs in this boring had reported concentrations that exceeded the screening criterion.

A1.14.2.2 2002 POLYNUCLEAR AROMATIC HYDROCARBON STUDY

Two soil borings (32EDC-5-102 and 32EDC-5-111) were advanced in AOC 14 during the 2002 PAH study (BEI 2005a). Samples were collected from between 0 and 8 feet bgs

and analyzed for PAHs. Concentrations of PAHs in soil samples from these two borings were below the screening criterion.

A1.14.2.3 POLYNUCLEAR AROMATIC HYDROCARBON REMOVAL ACTION

Soil in the upper 2 feet bgs with B(a)P equivalent concentrations in excess of 1,000 mg/kg was removed during the PAH TCRA at several EBS parcels, including an area of EBS Parcel 103 in AOC 14 (Foster Wheeler 2004). Additionally, 21 soil borings (SS20, TT17–22, UU16–21, VV16–20, WW15–17, and WW19) were advanced in AOC 14 as part of the PAH TCRA activities. Two or four soil samples were collected from each of these borings between 0 and 8 feet bgs, and were analyzed for PAHs. Soil from boring TT18 was also analyzed for arsenic. Only results from soil samples collected at depths not excavated during the removal action were reviewed for this Work Plan.

Soil samples from six locations (TT21, UU19, and WW16 from the 2-to-4-foot-bgs interval; UU20 from the 0.5-to-2-foot and 4-to-8-foot-bgs intervals; UU21 from the 0.5-to-2-foot-bgs interval; and VV17 from the 4-to-8-foot-bgs interval) had reported PAH concentrations that exceeded the screening criterion.

A1.14.3 Proposed Sampling Rationale and Design

AOC 14 was established to address reported elevated PAH concentrations in the area. The Navy and regulatory agencies agree that no further sampling is needed at AOC 14 because there are sufficient analytical results available to support the RI/FS. Sitewide DQOs that apply to AOC 14 and address the proposed HHRA activities are presented in Table 1-2 in the SAP.

A1.15 AREA OF CONCERN 15

AOC 15 is a 6.2-acre area on the eastern edge of Transfer Parcel EDC-5 bounded by West Midway Avenue on the north, Orion Street on the west, Stardust Place on the south, and Main Street on the east (Figure A1-16). AOC 15 includes the same area as EBS Parcel 102 and contains Building 152 in the west-central portion of the AOC as well as open space used for vehicle parking in the eastern portion of the AOC.

A1.15.1 Historical Use

AOC 15 contains Building 152, which was historically used as a snack bar, commissary, storage area, and jail. Chemicals stored in the building included floor polish, paint, and paint thinner inside a Conex box; potassium hydroxide (a fungicide or herbicide used in the manufacturing of soap); diethylaminoethanol (a corrosive inhibitor also used as an inert ingredient in pesticides); and corrosives. Waste including detergent, liquid plastic, and fat oil was also stored. Stains were observed on concrete under a generator, under an AST for diesel fuel, and beneath compressors near Building 152 (IT 2001a, BEI 2005b).

A1.15.2 Previous Investigations

Two investigations were conducted at AOC 15, and results of these investigations are summarized below. Locations sampled during previous investigations in and around AOC 15 are shown on Figure A1-16. Analytical results for soil samples collected within AOC 15 are summarized in Table A2-17 (included on CD in Appendix A2 to the SAP).

A1.15.2.1 ENVIRONMENTAL BASELINE SURVEY

Three soil samples (102-0001, 102-0001M, and 102-0002M) were collected in AOC 15 during the EBS to investigate the stained area around AST 152 (IT 2001a). Samples were collected from 0 to 1.5 feet bgs and analyzed for TPH. Reported TPH concentrations did not exceed screening criteria.

A1.15.2.2 2002 POLYNUCLEAR AROMATIC HYDROCARBON STUDY

Four soil borings (32EDC-5-121, 32EDC-5-122, 32EDC-5-132, and 32EDC-5-133) were advanced in AOC 15 during the 2002 PAH study (BEI 2005a). Samples were collected from 0 to 8 feet bgs and analyzed for PAHs. PAH concentrations in soil from borings 32EDC-5-122 (2 to 4 feet bgs) and 32EDC-5-132 (0 to 0.5 foot bgs) exceeded the screening criterion.

A1.15.3 Proposed Sampling Rationale and Design

AOC 15 addresses concentrations of PAHs in soil. The following discussion presents the problem statement and the optimized sampling design (DQO Steps 1 and 7). Sitewide DQOs that apply to AOC 15 are presented in Table 1-2 in the SAP.

Concentrations of PAHs in soil were identified above the screening criterion during the PAH study at two sample locations (32EDC-5-122 and 32EDC-5-132), and a limited number of samples have been collected in this area. Additional samples will be collected to assess the distribution of PAHs in soil at AOC 15. These data will be used to characterize the extent of PAH contamination and support an FS.

Soil samples will be collected from three locations, one location west and two locations east of Building 102. Three soil samples will be collected from each boring (0 to 2, 2 to 4, and 4 to 8 feet bgs). Soil sampling locations are shown on Figure A1-16. Samples will be analyzed for PAHs. In addition, two soil samples will be collected from one boring at AOC 15 and submitted for geotechnical analysis. The depths and locations of these geotechnical samples will be determined in the field.

A1.16 AREA OF CONCERN 16

AOC 16 is a 0.17-acre area in the eastern portion of Transfer Parcel EDC-5 (Figure A1-17) and in EBS Parcel 103. AOC 16 contains the northwestern portion of unoccupied Building FH-834 and landscaped open space.

A1.16.1 Historical Use

AOC 16 contains a portion of Building FH-834, which was historically used as apartments or family housing. The open space at AOC 16 was used for vehicle parking and recreation. It is not known which activities occurred in the AOC 16 open space areas.

A1.16.2 Previous Investigations

Two investigations were conducted at AOC 16, and results of these investigations are summarized below. Locations sampled during previous investigations in and around AOC 16 are shown on Figure A1-17. Analytical results for soil samples collected within AOC 16 are summarized in Table A2-18 (included on CD in Appendix A2 to the SAP).

A1.16.2.1 2002 POLYNUCLEAR AROMATIC HYDROCARBON STUDY

One soil boring (32EDC-5-120) was advanced in AOC 16 during the 2002 PAH study (BEI 2005a). Samples were collected from 0 to 8 feet bgs and analyzed for PAHs. PAH concentrations in soil collected from 2 to 4 feet bgs at location 32EDC-5-120 exceeded the screening criterion.

A1.16.2.2 POLYNUCLEAR AROMATIC HYDROCARBON REMOVAL ACTION

Soil in the upper 2 feet bgs with B(a)P equivalent concentrations greater than 1,000 mg/kg was removed in the West Housing Area at several EBS parcels using a grid pattern (Foster Wheeler 2004). Although no removal areas were located in AOC 16, three associated soil borings were advanced in AOC 16 (VV10, VV11, and WW11). Four soil samples were collected from each of these borings from 0 to 8 feet bgs and analyzed for PAHs. Reported concentrations did not exceed the screening criterion.

A1.16.3 Proposed Sampling Rationale and Design

AOC 16 was established to address reported PAHs in soil. The Navy and regulatory agencies agree that no further sampling is needed for AOC 16 because there are sufficient analytical results available to support the RI/FS. Site-wide DQOs that apply to AOC 16 and address the proposed HHRA activities are presented in Table 1-2 in the SAP.

A1.17 AREA OF CONCERN 17

AOC 17 is a 0.9-acre area on the western edge of Transfer Parcel EDC-5 at the intersection of Saratoga Street and West Tower Avenue (Figure A1-18), and is in EBS Parcel 185. AOC 17 consists of a small portion of the western end of Building 9, paved open space used for vehicle parking, and portions of Saratoga Street and West Tower Avenue. Railroad tracks traverse the southern portion of the site from east to west. AOC 17 is located adjacent to and east of IR Sites 5 and 12. IR Site 5 is an area of known TPH, PAH, and metals contamination in soil, and known xylene, chlorinated hydrocarbon, PAH, TPH, and cyanide contamination in groundwater. IR Site 12 is an area of known PAH contamination in soil.

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A1.17.1 Historical Use

Building 9 was historically used as a storage shed, maintenance facility, and aircraft storage area. As noted in the previous section, only a small portion on the western edge of the building is in AOC 17. Open space in AOC 17 was historically used for materials storage and vehicle parking (BEI 2005b).

A1.17.2 Previous Investigations

Two investigations were conducted at AOC 17, and results of these investigations are summarized below. Locations sampled in and around AOC 17 during previous investigations are shown on Figure A1-18. Analytical results for soil and groundwater samples collected within AOC 17 are summarized in Tables A2-19 and A2-20, respectively (included on CD in Appendix A2 to the SAP).

A1.17.2.1 PHASES 2B AND 3 INVESTIGATION

In 1991, soil and groundwater samples were collected during the Phases 2B and 3 investigation to assess whether contamination was present at IR Site 6, which is located 600 feet southeast of AOC 17 (PRC Environmental and Montgomery 1992). During this investigation, soil samples were also collected that were outside IR Site 6 but within the boundaries of AOC 17. One soil boring (B12-10) was advanced on the western edge of AOC 17. Soil samples were collected from 0 to 15.5 feet bgs, and were analyzed for VOCs, total recoverable petroleum hydrocarbons (TRPH), SVOCs, pesticides, PCBs, and metals. PAH concentrations in soil exceeded the screening criterion in samples collected from 0 to 0.5 foot bgs. No other analytes were reported at concentrations exceeding screening criteria.

A1.17.2.2 ENVIRONMENTAL BASELINE SURVEY

Seven soil samples (185I-001, -001M, -002, -002M, -005, -007, and -009) and two groundwater samples (185I-006 and 185I-008) were collected in AOC 17 during the EBS sampling to investigate the industrial sewer lines (IT 2001a). Soil and groundwater samples were analyzed for a combination of the following analytes: VOCs, TPH, TRPH, SVOCs, pesticides, PCBs, herbicides, organotins, and metals.

Soil sample 185I-002 had reported concentrations of TPH as diesel in excess of screening criteria. In addition, arsenic and aluminum were present at concentrations above screening criteria in both groundwater samples (185I-006 and 185I-008). Chromium concentrations from groundwater sample 185I-008 also exceeded screening criteria. No other analytes were present at concentrations above screening criteria in soil or groundwater (BEI 2005b).

A1.17.3 Proposed Sampling Rationale and Design

The sampling plan for AOC 17 primarily addresses metals, TPH, and VOCs from historical site activities at adjacent IR Site 5 that may have impacted groundwater.

Arsenic, aluminum, chromium, and TPH concentrations in groundwater exceeded screening criteria. The regulatory agencies requested that groundwater at AOC 17 be

assessed for the presence of VOCs. Therefore, additional soil and discrete groundwater samples will be collected to assess the presence of VOCs from previous site activities, to confirm metals concentrations reported in groundwater during EBS sampling, and to assess soil and groundwater for the presence of TPH. These data will be used to characterize the nature and extent of contamination, conduct an HHRA for this area, and support an FS.

Soil and discrete groundwater samples will be collected from three borings at AOC 17; soil samples will be collected at three depth intervals (0 to 2, 2 to 4, and 4 to 8 feet bgs). The proposed soil and discrete groundwater sampling locations are shown on Figure A1-18.

All soil and groundwater samples will be analyzed for VOCs, extractable-range TPH, metals, and hexavalent chromium. Groundwater samples will also be analyzed for TDS, if sufficient volume can be obtained. In addition, two soil samples will be collected from one boring at AOC 17 and submitted for geotechnical analysis. The depths and locations of these geotechnical samples will be determined in the field.

A1.18 AREA OF CONCERN 18

AOC 18 is a 0.08-acre area on the southwestern edge of Transfer Parcel EDC-5 (Figure A1-19), and is along the western edge of EBS Parcel 70. The portion of the parcel covered by AOC 18 consists entirely of open space adjacent to the southwestern corner of Building 39 (an engineering laboratory and maintenance hangar). NAS GAP 23 (storage lockers surrounded by 55-gallon drums) is located in AOC 18. A segment of former fuel line Corrective Action Area (CAA) B runs north-south through the western portion of the AOC.

A1.18.1 Historical Use

The portion of EBS Parcel 70 located in AOC 18 was historically used as an aircraft hangar (Building 39) and open space. Building 300 (a general warehouse) was also formerly located on the parcel. At the time of the EBS site inspection, Building 39, located immediately east of AOC 18, was used for light aircraft maintenance and painting, and housed Navy helicopters, sleds, a Navy standard laboratory, and offices.

The hazardous materials storage area (NAS GAP 23) was identified as a potential release area during the EBS inspection. NAS GAP 23 was located on a concrete area measuring 70 by 40 feet and located on the southwest side of Building 39; this GAP historically consisted of storage lockers surrounded by 55-gallon drums. Materials managed in this area may have included oil, solvent, paint-related materials, and rags.

The open space in the southern and eastern portions of EBS Parcel 70 was formerly used for vehicle parking and aircraft fueling. Seven Conex boxes were observed on the west side of the parcel during the EBS site inspection, and were reportedly used to store alodine, corrosives, paint, solvents, and miscellaneous hazardous wastes. The site is currently used for vehicle parking.

A1.18.2 Previous Investigations

Four investigations were previously conducted at AOC 18, and results of these investigations are summarized below. Locations sampled during previous investigations at and around AOC 18 are shown on Figure A1-19. Analytical results for soil samples collected within AOC 18 are summarized in Table A2-21 (included on CD in Appendix A2 to the SAP).

A1.18.2.1 ENVIRONMENTAL BASELINE SURVEY

Seven soil samples (070-0003M, -0004, -0004M, -0022M, -0023M, -0035, and -0036) were collected during the EBS investigation from 0 to 3.5 feet bgs (IT 2001a). Soil samples were analyzed for VOCs or TPH. These locations were sampled to investigate NAS GAP 23. Reported concentrations did not exceed screening criteria.

A1.18.2.2 CORRECTIVE ACTION DATA GAP INVESTIGATION

A corrective action data gap investigation was conducted at Alameda Point in 2001 to investigate removed fuel lines (TtEMI 2001b). The corrective action data gap investigation included the collection of samples at five EBS parcels located near the former fuel line, including samples at AOC 18, located in EBS Parcel 70. One soil boring (PA02-08) was advanced along the southern boundary of AOC 18. Two soil samples were collected from this boring from 0 to 7 feet bgs and analyzed for VOCs, TPH, and lead. One groundwater sample was also collected from this location and analyzed for VOCs, TPH, and lead. Reported concentrations did not exceed screening criteria.

A1.18.2.3 2002 POLYNUCLEAR AROMATIC HYDROCARBON STUDY

One soil boring (32EDC-5-24) was advanced in AOC 18 during the 2002 PAH study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. Concentrations of PAHs in all soil samples from this boring were below the screening criterion.

A1.18.2.4 SOLID WASTE MANAGEMENT UNIT REPORT

The NAS GAP 23 was included in the SWMU Report (SulTech 2005a). During preparation of the SWMU Report, previously existing data from the EBS investigation were further evaluated. The SWMU Report concluded that TPH concentrations present at the GAP site were a result of sitewide activities, rather than spills or leaks from the SWMU. It was determined that the site did not represent a significant source of contamination at EBS Parcel 70 because no VOCs had been reported and the site was completely paved; therefore, no further sampling was recommended. A letter from DTSC dated November 4, 1999, recommended NFA for NAS GAP 23.

A1.18.3 Proposed Sampling Rationale and Design

The sampling plan for AOC 18 addresses the hazardous waste storage area west of Building 39 (NAS GAP 23). The following discussion presents the problem statement

and optimized sampling design proposed for AOC 18 (DQO Steps 1 and 7). Sitewide DQOs that apply to AOC 18 are presented in Table 1-2 in the SAP.

Because a limited number of samples were collected and analyzed near the hazardous materials storage area and groundwater was not assessed, soil and discrete groundwater samples are proposed. These samples will be collected west of Building 39 to assess whether possible releases from storage of hazardous wastes in this area impacted soil or groundwater. These data will be used to characterize the nature and extent of contamination, conduct an HHRA for this area, and support an FS.

Soil samples will be collected from four borings at AOC 18 that target NAS GAP 23; three soil samples will be collected from each boring at 0 to 2, 2 to 4, and 4 to 8 feet bgs. Discrete groundwater samples will be collected from the two most downgradient borings. The proposed soil and discrete groundwater sampling locations are shown on Figure A1-19.

Soil and groundwater samples will be analyzed for VOCs, TPH (purgeable-range and extractable-range), SVOCs, pesticides, PCBs, and metals. In addition, two soil samples from one boring at AOC 18 will be submitted for geotechnical analyses. The depths and locations of these geotechnical samples will be determined in the field. Groundwater samples will also be analyzed for TDS, if sufficient volume can be obtained.

A1.19 AREA OF CONCERN 19

AOC 19 is in the southwestern portion of Transfer Parcel EDC-5 (Figure A1-1) and is adjacent to IR Site 6 on the east, an area with known chlorinated hydrocarbon contamination in groundwater. As agreed in discussions between the Navy and regulatory agencies, AOC 19 will be investigated as part of IR Site 6 and will not be investigated under IR Site 35.

A1.20 AREA OF CONCERN 20

AOC 20 is a 0.6-acre area in the southwestern tip of Transfer Parcel EDC-5 (Figure A1-20). AOC 20 includes two OWSs (OWS 012A and OWS 012B) that are aboveground along the northwestern edge of EBS Parcel 23F. The former fuel line CAA-B is located immediately south of AOC 20.

A1.20.1 Historical Use

EBS Parcel 23F was historically used as a taxiway and parking apron. Two helicopter landing pads and two OWSs were present in AOC 20. No buildings were located on AOC 20. Chemicals stored in the area included synthetic oils, Freon, trichlorofluoroethane, paint, and hazardous wastes (IT 2001a).

A1.20.2 Previous Investigations

Three investigations were conducted at AOC 20, and results of these investigations are summarized below. Locations sampled during previous investigations in and around

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AOC 20 are shown on Figure A1-20. Analytical results for soil samples collected within AOC 20 are summarized in Table A2-25 (included on CD in Appendix A2 to the SAP).

A1.20.2.1 ENVIRONMENTAL BASELINE SURVEY

Five soil samples (023-0019M, -0020, -0020M, -0034M, and -0035M) were collected in AOC 20 during the EBS investigation from 0 to 2 feet bgs (IT 2001a). Soil samples were analyzed for TPH and metals. These locations were sampled to investigate OWS 012A and OWS 012B. Reported TPH and metals concentrations did not exceed screening criteria.

A1.20.2.2 2002 POLYNUCLEAR AROMATIC HYDROCARBON STUDY

One soil boring (32EDC-5-12) was advanced in AOC 20 during the 2002 PAH study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. Concentrations of PAHs in all soil samples from this boring were below the screening criterion.

A1.20.2.3 SOLID WASTE MANAGEMENT UNIT REPORT

The two OWSs in AOC 20 near Building 3 were included in the SWMU Report (SulTech 2005a). During preparation of the SWMU Report, previously existing data from the EBS investigation were evaluated further. The SWMU Report concluded that since all contaminant concentrations from previous investigations were below screening criteria, NFA was recommended.

A1.20.3 Proposed Sampling Rationale and Design

The sampling plan for AOC 20 addresses the two OWSs in EBS Parcel 23F (012A and 012B). The following discussion presents the problem statement and optimized sampling design proposed for AOC 20 (DQO Steps 1 and 7). Sitewide DQOs that apply to AOC 20 are presented in Table 1-3 in the SAP.

Previous investigations did not identify TPH or metals at concentrations above the screening criteria at the two soil locations that targeted these OWSs. Regulatory agencies have requested additional soil and discrete groundwater samples at each of the two OWS locations in AOC 20 to assess whether soil and/or groundwater have been impacted.

Soil and discrete groundwater samples will be collected from one boring adjacent to and on the assumed downgradient side of each OWS; three soil samples will be collected from each boring (0 to 2, 2 to 4, and 4 to 8 feet bgs). The proposed soil and discrete groundwater sampling locations are shown on Figure A1-20.

Soil and groundwater samples will be analyzed for VOCs, extractable-range TPH, and metals. Groundwater analyses will also be analyzed for mercury using U.S. EPA Method 1631 to detect concentrations down to 0.1 ng/L and, if sufficient volume can be obtained, for TDS.

A1.21 AREA OF CONCERN 21

AOC 21 is a 0.67-acre area in the southwestern portion of Transfer Parcel EDC-5 (Figure A1-21), and is along the northwestern edge of EBS Parcel 23F. The portion of the parcel covered by AOC 21 is entirely paved open space. Two segments of former fuel line CAA-B run through the southern and western portions of the site.

A1.21.1 Historical Use

EBS Parcel 23F was historically used as a taxiway and parking apron. No buildings were located on AOC 21. Chemicals stored in the area included synthetic oils, Freon, trichlorofluoroethane, paint, and hazardous wastes (BEI 2005b).

A1.21.2 Previous Investigations

Two investigations were conducted at AOC 21, and results of these investigations are summarized below. Locations sampled during previous investigations in and around AOC 21 are shown on Figure A1-21.

A1.21.2.1 ENVIRONMENTAL BASELINE SURVEY

Six soil samples (023-0050, -0052, -0053, -0055, -0059, and -0061) were collected in AOC 21 during the EBS investigation from 1 to 4 feet bgs (IT 2001a). Four groundwater samples (023-0051, -0054, -0056, and -0061) were also collected in AOC 21. Soil and groundwater samples were analyzed for VOCs, TPH, and SVOCs. TPH concentrations in soil sample 023-0052 exceeded the screening criteria. Other reported concentrations in soil and groundwater did not exceed screening criteria. Trichloroethene (TCE) was reported in groundwater samples collected at AOC 21, but not at concentrations that exceed screening criteria.

A1.21.2.2 CORRECTIVE ACTION DATA GAP INVESTIGATION

The corrective action data gap investigation was conducted at Alameda Point in 2001 and included the collection of additional samples at five EBS parcels, including EBS Parcel 23F in AOC 21 (TtEMI 2001b). One soil boring (PA02-04) was advanced along the southern boundary of AOC 21 during the investigation. Two soil samples (2 to 3 and 5 to 6 feet bgs) and one groundwater sample were collected from the boring and analyzed for VOCs, TPH, and lead. Reported concentrations did not exceed screening criteria.

A1.21.3 Proposed Sampling Rationale and Design

The sampling plan for AOC 21 addresses TCE reported in groundwater at two locations (023-0051 and 023-0054). The following discussion presents the problem statement and optimized sampling design proposed for AOC 21 (DQO Steps 1 and 7). Sitewide DQOs applicable to AOC 21 are presented in Table 1-2 in the SAP.

While reported TCE concentrations are below the screening criterion, the Site Inspection Report for Transfer Parcel EDC-5 recommended further evaluation based on the results of risk calculations. (Cancer risk associated with TCE in these two samples was greater

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than 10^{-5} .) Additional soil and discrete groundwater samples will be collected in the assumed downgradient direction from the two previous samples to assess the distribution of VOCs in groundwater from previous site activities and confirm that concentrations are below screening criteria. These data will be used to characterize the nature and extent of contamination, conduct an HHRA for this area, and support an FS.

Soil samples will be collected from two borings at AOC 21 located on the assumed downgradient side of the EBS borings 023-0051 and 023-0054; three soil samples will be collected from each boring (0 to 2, 2 to 4, and 4 to 8 feet bgs). Groundwater samples will be collected from each boring. The proposed soil and discrete groundwater sampling locations are shown on Figure A1-21.

Soil and groundwater samples will be analyzed for VOCs. Groundwater samples will also be analyzed for TDS, if sufficient volume can be obtained. Although TPH concentrations were reported in soil sample 023-0052, no further investigation of TPH will be conducted as part of the IR Site 35 study. Sample 023-0052 was collected adjacent to a fuel line and in former fuel line CAA-B; therefore, investigation (if needed) of the nature and extent of TPH in this area will be handled under the Alameda Point TPH Program.

A1.22 AREA OF CONCERN 22

AOC 22 is in the southwestern portion of Transfer Parcel EDC-5, along the northeastern edge of EBS Parcel 23F (Figure A1-1). Former fuel line CAA-B runs through the southern half of the site.

AOC 22 was established to address reported SVOC contamination in groundwater. As agreed in discussions between the Navy and regulatory agencies, AOC 22 will be addressed as part of the Alameda Point TPH Program and will not be included in IR Site 35.

A1.23 AREA OF CONCERN 23

AOC 23 is a 15.2-acre area in the south-central portion of Transfer Parcel EDC-5 (Figure A1-22). AOC 23 was established to address soil and groundwater contaminants in areas previously used for chemical storage or handling at eight EBS parcels (EBS Parcels 71, 72, 110, 121, 123, 124, 125, and 126). Additionally, the regulatory agencies requested further evaluation of NAS GAP 29 and Naval Aviation Depot (NADEP) GAP 43, OWS 067, and SWMU AOC 098.

This section addresses AOC 23 and provides area-specific descriptions of the eight EBS parcels, including the location, historical uses, and previous investigations for each parcel. The sampling rationale and design for each EBS parcel are also detailed in the following subsections and are summarized as follows.

Collection of soil and/or groundwater samples is proposed at a total of 41 locations in AOC 23 as follows.

- Collection of both soil and groundwater samples is proposed at 30 of the 41 locations.
- Collection of soil samples only is proposed at 1 of the 41 locations.
- Collection of groundwater samples only is proposed at 10 of the 23 locations.

The proposed sampling locations are shown on Figure A1-22. Analytical results for soil and groundwater samples collected within AOC 23 are summarized in Tables A2-29 and A2-30, respectively (included on CD in Appendix A2 to the SAP). Soil and groundwater samples will be analyzed for one or more of the following: VOCs, TPH (purgeable-range and extractable-range), SVOCs, pesticides, PCBs, metals, mercury using U.S. EPA Method 1631 to detect concentrations down to 0.1 ng/L and, if sufficient volume can be obtained, for TDS. In addition, four soil samples from two borings at AOC 23 will be submitted for geotechnical analyses. The depths and locations of these geotechnical samples will be determined in the field. These data will be used to characterize the nature and extent of contamination, conduct an HHRA for this area, and support an FS.

A1.23.1 EBS Parcel 71

EBS Parcel 71 is in the northwestern portion of AOC 23. Subsequent to the completion of the EBS, EBS Parcel 71 was subdivided into two parcels: EBS Parcel 71 and EBS Parcel 71A. Therefore, the current extent of EBS Parcel 71 is a subset of the original EBS Parcel 71 that was included in the 1994 EBS. One building (Building 544) is present on EBS Parcel 71. Buildings 45A and 45B were also historically located on the parcel and reportedly connected to one another, although only evidence of Building 45B is currently observable. A washdown area known as WD-041B was located in the northern portion of EBS Parcel 71. EBS Parcel 71 is adjacent to IR Site 6, where chlorinated hydrocarbons have been reported in groundwater and PAHs have been reported in soil.

A1.23.1.1 HISTORICAL USE

No significant chemical storage was reported in the EBS at EBS Parcel 71 (25 gallons of desiccant was stored); however, the PEP reported that metals, fuels, solvents, and lubricating oils were stored in a shed. EBS Parcel 71 was historically used as a general storage shed (Building 45B) and as a liquid oxygen/nitrogen facility (Building 544). During the EBS, several stains were observed in the open space, including gray stains, oily stains from runoff, and a large area covered with oil from support equipment. Various spills and incidents were recorded, including diesel and hydraulic fluid spills under the shed, oil and paint stains from washdowns in the vicinity of former Buildings 45A and 45B, and minor stains associated with vehicle parking (IT 2001a). None of these stains were visible during a site visit by BEI in August 2005. Additionally, batteries were stored on a pallet in a shed area where washdown of maintenance equipment occurred.

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A1.23.1.2 PREVIOUS INVESTIGATIONS

Three investigations were conducted at EBS Parcel 71, and results of these investigations are summarized below. Locations sampled in and around EBS Parcel 71 in AOC 23 are shown on Figure A1-22.

Phases 2B and 3 Investigation

In 1991, 13 soil samples were collected from three locations in EBS Parcel 71 (B06-08 through B06-10) during the Phase 2B and 3 investigation (PRC Environmental and Montgomery 1992). This study was conducted to assess whether contamination exists in the vicinity of IR Site 6, which is adjacent to the western edge of EBS Parcel 71. Samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. Analytical results indicated the presence of PAHs at concentrations above the screening criterion in samples at two locations (B06-09 and B06-10). In addition, iron was reported in a sample from B06-09 at a concentration exceeding the screening criteria.

Environmental Baseline Survey

Samples were collected from three locations in and around the washdown area during the EBS to address the storage and use of chemicals in that area (ERM-West 1994a). Four soil samples (071-0001, -0002, and duplicate pair 071-0003, and -0005) were initially collected in the target area from 3 to 3.5 feet bgs and analyzed for VOCs, TPH, and metals. All analytes were reported below their screening criteria in samples from the washdown area.

One soil sample (071I-001) was collected at 8.5 to 9 feet bgs along the industrial waste sewer corridor and analyzed for VOCs, TPH, SVOCs, pesticides, PCBs, herbicides, organic lead, butyltin, metals, oil and grease, and reactivity. The analytes were reported below screening criteria or were not reported.

One sanitary sewer soil sample (071S-002) was collected at 4 to 4.5 feet bgs and analyzed for VOCs, TPH, SVOCs, and metals. All analytes were reported below screening criteria.

Three storm sewer soil samples (071M-002, -003, and -004) were collected at 6.5 to 8 feet bgs and analyzed for VOCs, TPH, SVOCs, pesticides, PCBs, butyltin, oil and grease, metals, and reactivity. Benzene was reported at a concentration exceeding the screening criterion. The remaining analytes were reported at concentrations below screening criteria.

As a result of the initial storm sewer sampling, three soil samples (071M-012, -014, and -020) and seven groundwater samples (071M-010, -011, -013, and -015 through -018) were collected and analyzed for VOCs, TPH, and SVOCs. In one groundwater sample (071M-013), B(a)P was reported at a concentration above its screening criterion. The remaining analytes were reported at concentrations below screening criteria.

Additional soil and groundwater samples (071M-019, -020, and -021) were collected from one location outside the boundaries of EBS Parcel 71 (in EBS Parcel 124) to

address the EBS concern about storm sewers. The sample was analyzed for VOCs, TPH, and SVOCs. All analytes were reported at concentrations below screening criteria.

Operable Units 1 and 2 Data Gap Investigation

Data gap samples collected in EBS Parcel 71 were collected in association with the investigation of a storm sewer exposure pathway (TtEMI 2002c). To determine whether storm sewer bedding materials were acting as a preferential pathway for contaminant migration, soil and groundwater samples were collected at location S06-DGS-VE02, which is along a storm sewer line on the downgradient edge of a known plume. Vacuum excavation was used to advance the boring immediately adjacent to the storm sewer line and to collect undisturbed samples of the bedding material. Results of geotechnical analyses indicated the permeability of the storm drain system bedding material and native fill soils was similar, and it was concluded that the bedding materials would not act as preferential conduits for the transport of contaminants in groundwater. No contaminants were reported at concentrations above screening criteria in the soil or groundwater samples.

2002 Polynuclear Aromatic Hydrocarbon Study

One soil boring (32EDC-5-66) was advanced in EBS Parcel 71 during the 2002 PAH study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. Concentrations of PAHs in all soil samples from this boring were below the screening criterion.

Remedial Investigation for IR Sites 6, 7, 8, and 16

IR Site 6, which is adjacent to the western side of EBS Parcel 71 and the northern side of EBS Parcel 72, is characterized by a VOC plume described in the final RI Report for IR Sites 6, 7, 8, and 16 (TtEMI 2004). The outer margins of this plume are at or near the border with AOC 23 (EBS Parcels 71 and 72). The most recent data collected during the basewide monitoring program (ITSC 2005) indicate that groundwater contamination at IR Site 6 (groundwater impacted with TPH and chlorinated VOCs, primarily cis-1,2-dichloroethene and vinyl chloride) may extend to EBS Parcel 71.

Solid Waste Management Unit Report

Washdown area WD-041B was described in the SWMU Report prepared by SulTech in 2005 (SulTech 2005a). The SWMU Report stated that drains were present in a washdown area outside of the northeast corner of Building 41; however, an OWS was not present. Material listed as managed in this area included wastewater from cleaning aircraft or large machinery. The SWMU Report for Transfer Parcel EDC-5 recommended NFA for WD-041B.

A1.23.1.3 PROPOSED SAMPLING RATIONALE AND DESIGN

The problem statement and optimized sampling design (DQO Steps 1 and 7) proposed for EBS Parcel 71 in AOC 23 are presented in this subsection. Sitewide DQOs that apply to EBS Parcel 71 in AOC 23 are presented in Table 1-2 in the SAP.

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The PEP reported that metals, fuels, solvents, and lubricating oils were stored in an equipment shed and fenced area located in the northern area of EBS Parcel 71 adjacent to Building 41. The washdown area identified as WD-041B in the 2005 SWMU Report is located in this fenced area (no OWS is located in this washdown area), which occupies approximately 4,000 square feet. Three soil samples were collected in and around this washdown area; analytical results were below screening levels. No groundwater samples were collected in the washdown area, but results of groundwater samples collected in the assumed downgradient direction in the southern portion of EBS Parcel 71 were below screening criteria for VOCs, SVOCs, and TPH.

Results of samples collected in the southeastern portion of EBS Parcel 71 identified VOCs (specifically benzene) in soil at concentrations above screening criteria and PAHs in groundwater at concentrations above the screening criterion. Surrounding soil and groundwater samples generally define the extent of the exceedances in this area. Iron was identified in one sample as the only metal in soil present at a concentration above screening criteria. PAHs were identified at concentrations above the screening criterion in the same sample and in another sample collected to the north. Groundwater samples collected at EBS Parcel 71 were not analyzed for metals.

Both soil and discrete groundwater samples will be collected at EBS Parcel 71; soil samples will be collected from three depth intervals (0 to 2, 2 to 4, and 4 to 8 feet bgs). The proposed soil and discrete groundwater sampling locations are shown on Figure A1-22.

Soil and discrete groundwater samples will be collected from two borings in the former washdown area. Samples collected from these borings will also be used to assess the distribution of PAHs in soil reported at previous boring B06-10. Soil and groundwater samples will be analyzed for VOCs, TPH (purgeable-range and extractable-range), SVOCs, pesticides, PCBs, and metals.

Soil and discrete groundwater samples will also be collected from a boring south of the washdown/storage area to assess the distribution of PAHs and confirm iron concentrations in soil. This boring will be located on the assumed downgradient side of boring B06-09; soil and groundwater samples will be analyzed for VOCs, PAHs, and metals.

Soil and discrete groundwater samples will be collected from a boring in the southeastern portion of EBS Parcel 71 at previous boring 071M-004 to confirm the presence of benzene in soil and nearby PAHs identified in groundwater. Soil and groundwater samples will be analyzed for VOCs and PAHs.

Soil and discrete groundwater samples will also be collected from two borings: one south of the washdown/storage area on the eastern side of EBS Parcel 71 and one in the southern portion of the parcel. These samples are proposed to provide wider coverage in areas not previously sampled. Soil and groundwater samples will be analyzed for VOCs, TPH (extractable-range and purgeable-range), SVOCs, pesticides, PCBs, and metals. The groundwater samples from the most southern location will also be analyzed for mercury using U.S. EPA Method 1631 to detect concentrations down to 0.1 ng/L.

All groundwater samples at EBS Parcel 71 will also be analyzed for TDS, if sufficient volume can be obtained.

A1.23.2 EBS Parcel 72

EBS Parcel 72 is in the western portion of AOC 23. Two buildings (Buildings 77 and 77A) were historically located on EBS Parcel 72, but only Building 77 remains. This parcel is adjacent to and hydraulically downgradient from IR Site 6.

A1.23.2.1 HISTORICAL USE

Building 77 at EBS Parcel 72 was historically used as a heating plant, an air cargo terminal, and an electrical distribution shelter. An old storage building (Building 77A) was historically located in the northwestern corner of the parcel.

A1.23.2.2 PREVIOUS INVESTIGATIONS

Sampling was conducted at EBS Parcel 72 during the EBS (IT 2001a). As part of the EBS concern for pesticide use in landscaped and unpaved areas, three soil samples were collected and analyzed for pesticides and PCBs. These analytes were reported at concentrations below the screening criteria. Although there are no potential releases known to be associated with historical activities at the parcel, chlorinated hydrocarbons are known to be present in groundwater at adjacent IR Site 6. Locations sampled during the EBS are shown on Figure A1-22.

IR Site 6, which is adjacent to the north of EBS Parcel 72 located in AOC 23, is characterized by a VOC plume described in the final RI Report for IR Sites 6, 7, 8, and 16 (TtEMI 2004). The outer margins of this plume are at or near the border with AOC 23. The most recent data collected during the basewide monitoring program (ITSC 2005) indicate that groundwater contamination at IR Site 6 (groundwater impacted with TPH and chlorinated VOCs, primarily cis-1,2-dichloroethene and vinyl chloride) likely extends to EBS Parcel 72.

A1.23.2.3 PROPOSED SAMPLING RATIONALE AND DESIGN

The problem statement and optimized sampling design (DQO Steps 1 and 7) proposed for EBS Parcel 72 in AOC 23 are presented in this subsection. Sitewide DQOs that apply to EBS Parcel 72 in AOC 23 are presented in Table 1-2 in the SAP.

Previous investigations evaluated soil at EBS Parcel 72 for pesticides and PCBs as part of the EBS concern for pesticide use in landscaped and unpaved areas. Pesticide and PCB concentrations in soil were not reported above screening criteria. No groundwater samples were collected.

This parcel is adjacent to and hydraulically downgradient of IR Site 6, where chlorinated hydrocarbons have been reported in groundwater. Therefore, a discrete groundwater sample will be collected to assess the impact to groundwater, if any, from VOCs at IR Site 6. The proposed sampling location, shown on Figure A1-22, will be in the

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northwestern portion of EBS Parcel 72. The groundwater sample will be analyzed for VOCs and, if sufficient volume can be obtained, for TDS.

A1.23.3 EBS Parcel 110

EBS Parcel 110 is in the northeastern portion of AOC 23. Two buildings (Buildings 271 and 590) were historically located on EBS Parcel 110. Presently, only Building 271 remains. Railroad tracks traverse the parcel from the northwestern corner to the southern portion of the site.

A1.23.3.1 HISTORICAL USE

EBS Parcel 110 was historically used as a hazardous/flammable storehouse (Building 271) and an industrial waste pump station (Building 590). Gas cylinder storage and miscellaneous chemical storage occurred indoors. Stored chemicals included paint thinner, corrosion resistant coating, floor polish, trichlorotrifluoroethane, TCE, chromic acid, sodium fluorosilicate, Freon, acetylene, sulfur hexafluoride, monoethanolamine, and transmission fluid.

Aerial photographs and EBS inspection information indicate that undocumented spills may have occurred. A battery acid spill (4 by 10 feet) and other dark, oil-like stained areas (4 by 6 feet) were present in the area surrounding the storehouse. A storage yard for helicopter blades, Conex boxes, and furniture was present in the open space adjacent to the storehouse. A concrete vault containing fluid and a pile of metal shavings were present during the EBS inspection, but the exact locations are not known. Stains were noted throughout the storage yard, including oil, grease, and tar-like stains. Stains were still visible on concrete on the east and west sides of the building during an August 2005 site walk (Figure A1-22). The PEP stated that stains were on concrete and were considered minor. Therefore, no parcel-specific sampling was recommended.

A1.23.3.2 PREVIOUS INVESTIGATIONS

Two investigations were conducted at EBS Parcel 110, and results of these investigations are summarized below. Locations sampled in and around EBS Parcel 110 in AOC 23 are shown on Figure A1-22.

Environmental Baseline Survey

Two subsurface soil samples (110-0001M and 110-0002M) were collected from 1 to 1.5 and 2 to 2.5 feet bgs, respectively, from along railroad lines and analyzed for TPH, SVOCs, PCBs, and lead to investigate whether these railway areas may have been impacted by releases from engines and railcars (IT 2001a). No compounds were reported at concentrations above screening criteria.

Six subsurface soil samples (110I-001, 110I-001M, 110I-002, 110I-002M, 110P-001, and 110P-001M) were collected along the industrial waste sewer lines from 5 to 9 feet bgs and analyzed for a combination of the following: TPH, SVOCs, herbicides, organophosphate pesticides, PCBs, organic lead, butyltin, oil and grease, metals, and reactivity. All analyte concentrations were below screening criteria.

Two additional EBS sampling locations were also within the boundaries of EBS Parcel 110; however, samples (123-0013, 123-0021, 123-0022, 123-0044, and 124-0004) from these locations were collected to address environmental issues in adjacent parcels (EBS Parcels 123 and 124) and thus are discussed in the subsections for those EBS parcels below.

2002 Polynuclear Aromatic Hydrocarbon Study

Two soil borings (32EDC-5-80 and 32EDC-5-91) were advanced in EBS Parcel 110 during the 2002 PAH study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. Concentrations of PAHs in all soil samples from these borings were below the screening criterion.

A1.23.3.3 PROPOSED SAMPLING RATIONALE AND DESIGN

The problem statement and optimized sampling design (DQO Steps 1 and 7) proposed for EBS Parcel 110 in AOC 23 are presented in this subsection. Sitewide DQOs that apply to EBS Parcel 110 in AOC 23 are presented in Table 1-2 in the SAP.

A limited number of samples were collected in EBS Parcel 110, especially around Building 271 where stains were noted in the EBS. Because the stains were on concrete, the PEP considered them of minor importance. However, Building 271 was used extensively for chemical storage. Additionally, an industrial waste pump station is located in the southern portion of EBS Parcel 110 (housed in Structure 590).

Previous investigations did not identify soil contaminants above screening criteria for VOCs, SVOCs, PCBs, pesticides, herbicides, metals, and TPH; however, no samples were collected within the stained areas around Building 271, the pump station was not targeted for sampling, and groundwater was not assessed. Therefore, soil and discrete groundwater samples will be collected to assess the potential impact from chemical storage at Building 271 and in the adjacent storage yard, and impact from possible releases from the industrial waste pump station.

Both soil and discrete groundwater samples will be collected at EBS Parcel 110; soil samples will be collected from three depth intervals (0 to 2, 2 to 4, and 4 to 8 feet bgs). The proposed soil and discrete groundwater sampling locations for EBS Parcel 110 in AOC 23 are shown on Figure A1-22.

Borings will be advanced at EBS Parcel 110 as follows:

- in the stained area west of Building 271 on the assumed downgradient side of the building to assess the possible impact to soil and groundwater from chemicals that were stored in the building and adjacent storage area
- in the stained area east of Building 271 to assess possible impact to soil and groundwater from chemicals stored in the building
- north of Building 271 for use in assessing groundwater
- south of Building 271 for use in assessing groundwater

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- under Building 271 to assess possible impacts from minor staining observed on the floor of the building to assess whether contaminants from the pump station impacted soil or groundwater
- as close as possible to the reported former location of Building 590 (industrial waste pump station)
- in the southwest portion of Parcel 110 to provide more sample coverage in an area not previously sampled

Soil and groundwater samples from these borings will be analyzed for VOCs, TPH (purgeable-range and extractable-range), SVOCs, pesticides, PCBs, and metals. Groundwater samples will also be analyzed for TDS, if sufficient volume can be obtained.

A1.23.4 EBS Parcel 121

EBS Parcel 121 is in the eastern portion of AOC 23. A portion of former Building 79-2 was the only structure historically present on EBS Parcel 121. IR Site 3, an area with known groundwater contamination (chlorinated hydrocarbons, TPH, and benzene) and soil contamination (metals, PAHs, and TPH) is located immediately south of EBS Parcel 121 and is separated from EBS Parcel 121 on the east by Building 564.

A1.23.4.1 HISTORICAL USE

EBS Parcel 121 was historically used for open space storage and a garden shop, which was later demolished and converted to a parking lot. Minor stains associated with vehicle parking were noted during the EBS. Potential runoff from the neighboring junkyard area was also noted.

A1.23.4.2 PREVIOUS INVESTIGATIONS

No analytical results from soil or groundwater sampling have been reported from previous investigations at EBS Parcel 121.

A1.23.4.3 PROPOSED SAMPLING RATIONALE AND DESIGN

The problem statement and optimized sampling design (DQO Steps 1 and 7) proposed for EBS Parcel 121 in AOC 23 are presented in this subsection. Sitewide DQOs that apply to EBS Parcel 121 in AOC 23 are presented in Table 1-2 in the SAP.

EBS Parcel 121 was historically used for open space storage and a garden shop, which was later demolished and converted to a vehicle parking lot. The PEP states that no chemicals were stored or used at EBS Parcel 121, and no spills are documented.

No sampling has been conducted at EBS Parcel 121; therefore, soil and groundwater samples will be collected from one centrally located boring to assess the presence of contaminants in soil and groundwater to provide more sampling coverage in this portion of AOC 23, where previous samples were not collected. Soil samples will be collected from three depth intervals (0 to 2, 2 to 4, and 4 to 8 feet bgs). The proposed soil and

discrete groundwater sampling location for EBS Parcel 121 in AOC 23 is shown on Figure A1-22.

Soil and groundwater samples from this boring will be analyzed for VOCs, TPH (purgeable-range and extractable-range), SVOCs, pesticides, PCBs, and metals. Groundwater will also be analyzed for TDS, if sufficient volume can be obtained.

A1.23.5 EBS Parcel 123

EBS Parcel 123 is in the east-central portion of AOC 23. Historically, six buildings were located on EBS Parcel 123: Buildings 67, 79-2, 98, 263, 393, and 412 (Building 412 was observed to be numbered "411" during a site walk in August 2005). Presently, five of these buildings remain (Buildings 67, 98, 263, 393, and 412). Five SWMUs are located on this parcel: SWMU AOC 098 and OWS 067 in the southern portion of the site, NAS GAPs 15 and 29 in the northern portion of the site, and UST(R)-11. The UST (known alternatively as Tank 393) was historically located between West Trident Avenue and Building 393. IR Site 3 is located immediately south of EBS Parcel 123 and is part of a larger area characterized by groundwater contamination (chlorinated hydrocarbons, TPH, and benzene) and soil contamination (metals, PAHs, and TPH). Railroad tracks run north-to-south and north-to-southeast across the west-central portion of the parcel.

A1.23.5.1 HISTORICAL USE

EBS Parcel 123 was historically used as barracks, an aircraft ground support equipment shop, a switching substation, a field maintenance shop, a hazardous/flammable storehouse, an electrical substation, an industrial waste pump station, and for painting and sandblasting operations. The following chemicals were used or stored in buildings at the parcel: gasoline, fuels, diesel, oils, acetylene, argon, degreasing solution, fertilizer, solvents, corrosion inhibitors, break fluid, aluminum paint, and spray enamels. Hazardous wastes including flammables, corrosives, batteries, aerosols, paint, used rags, and used spill kits were stored inside Building 98 and the building's fenced-in enclosure.

The asphalt floor of Building 98 was observed during the EBS investigation to be heavily stained and deteriorated. Building 263, an aircraft ground support equipment shop, was used historically for storage of oil, gasoline, diesel, and acetylene. During the EBS inspection, intense petroleum odors and stains were noted. An OWS was present near Building 67, a building used for repair activities that were reported to involve heavy metals, solvents, and petroleum products. Additionally, batteries, paint thinner, paint, primer, diesel and gasoline, and other chemicals were stored in the yard of Building 67. Stains were observed in the shop areas of Building 67.

Building 393 was used for painting and sandblasting activities and for minor maintenance activities. Paint and oil stains were observed during the EBS inspection; however, the stains were on concrete and were considered minor.

Building 412, an electrical substation, had scattered stains on the concrete floor. Transformers at the building were reported to have leaked. The stains were considered

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minor, and the EBS recommended that the stains be addressed as part of the electrical equipment program.

During the EBS open space survey, storage of miscellaneous materials including diesel generators, modular trailers, and diesel fueling trailers was observed. The open space was also used for forklift/truck parking, boat/truck storage and repair, fuel transfer to and from boats, vehicle washing and steam cleaning (near a former paint booth), deployment gear storage, an equipment recycling and storage area, and a salvage and reuse storage area. Approximately 500 gallons of petroleum products, halogenated and nonhalogenated organic compounds, and corrosives were stored near Building 393. A leaking drum of lubricating oil appearing to impact a nearby storm drain was observed in this area.

Heavy stains were observed in the open space between Buildings 67 and 393 during the EBS inspection and aerial photograph review. Stains were also observed north and south of Building 67. Previous sampling at the parcel during the removal of UST(R)-11 (used to store solvents, paints, and waste oils) indicated the presence of petroleum-related compounds (e.g., BTEX and TPH) and metals including cadmium, chromium, lead, mercury, and zinc. UST(R)-11, which had a capacity of 600 gallons, was removed in November 1994. Closure of UST(R)-11 was a request from the DTSC in February 2000.

SWMU AOC 098 was used for storage of hazardous wastes, including waste petroleum products, corrosives, metals, asbestos, nonhalogenated organic compounds, solvents, lubricating oil, and corrosion inhibitors. SWMU AOC 098 has been recommended for NFA in the SWMU Report (SulTech 2005a). SWMU AOC 098 is located inside Building 98 and was used as a 60-day temporary accumulation point where hazardous wastes were stored in 55-gallon drums on top of the concrete floor.

NAS GAP 15 and NAS GAP 29 were used for storage of waste paint material, solvents, thinner, rags, and waste oil and have been recommended for NFA in the SWMU Report. Originally, NAS GAP 15 was located northeast of Building 67, but was made inactive in 1991 and a new SWMU (NAS GAP 29) was sited northwest of Building 67. NAS GAP 29 was made inactive in 1997.

OWS 067 received waste materials collected from the parking area south of the automotive repair shop. The OWS was recommended for further investigation in the SWMU Report.

A1.23.5.2 PREVIOUS INVESTIGATIONS

Four investigations were conducted at EBS Parcel 123, and results of these investigations are summarized below. Locations sampled in and around EBS Parcel 123 in AOC 23 are shown on Figure A1-22.

Environmental Baseline Survey

A target area was identified to address stains observed at Building 98 in EBS Parcel 123 (IT 2001a). Eight surface and subsurface soil samples (123-0001, -0001M, -0002M, -0003M, -0015, -0015M, -0016M, and -0017M) were collected in the most heavily stained

areas and analyzed for VOCs (subsurface soil samples only), TPH, SVOCs, and metals. No analytes were reported at concentrations above their respective screening criteria.

Four surface soil samples (123-0004M, -0005, -0005M, and -0020M) were collected to investigate odors and the most heavily stained areas at Building 263; the samples were analyzed for TPH. TPH constituents were not reported at concentrations above screening criteria.

Four soil samples (123-0006M, -0007, -0007M, and -0008M) were collected at 1 to 2 feet bgs to address the most heavily stained areas at Building 67 and analyzed for TPH, SVOCs, PCBs, and metals. No analytes were reported at concentrations above screening criteria.

A target area was identified to address the stained area south of Building 67. No sampling was recommended in the area north of Building 67 because sampling had previously been conducted and no contamination was found. Four surface and subsurface soil samples (123-0009M, -0010, -0010M, and -0018M) were collected and analyzed for VOCs (subsurface soil sample only), TPH, SVOCs, and metals. No analytes were reported at concentrations above screening criteria.

A target area was identified to address heavy stains in the open space between Buildings 67 and 393. Surface and subsurface soil samples (123-0011M and 123-0012M) were collected and analyzed for VOCs (subsurface and confirmation samples only), TPH, SVOCs, and metals. No analytes were reported at concentrations above screening criteria.

An EBS target area was identified to address the concern about railroad tracks. Four surface soil samples (123-0014 and 123-0014M from EBS Parcel 123, and 123-0013M and 123-0021M from north in EBS Parcel 110) were collected and analyzed for TPH, SVOCs, PCBs, and lead. No analytes were reported at concentrations above screening criteria.

Two subsurface soil samples (123I-001 and 123I-001M) were collected to address concerns about the industrial waste sewer corridor. The samples were analyzed for VOCs, TPH, SVOCs, herbicides, pesticides, PCBs, butyltin, organic lead, oil and grease, metals, and reactivity. No analytes were reported above screening criteria.

Phase 2C sampling was conducted to address potential contamination from both the northeast and northwest locations of NAS GAPs 15 and 29 near Building 67 as well as UST(R)-11. Seven soil samples (123-0022 through -0026, -0044, and -0004) were collected at the former location of NAS GAP 29. These samples were analyzed for VOCs, TPH, pesticides, PCBs, and metals. One sample (123-0022) had concentrations of a PCB (Aroclor 1260) and arsenic exceeding screening criteria. Five soil samples (123-0027 through 123-0031) were collected to evaluate NAS GAP 15 (it was incorrectly reported in the EBS as NAS GAP 29). These samples were analyzed for VOCs, TPH, pesticides, PCBs, and metals. No analytes were reported at concentrations exceeding their screening criteria. Four HydroPunch groundwater samples (123-0040 through 123-0043) were collected to evaluate UST(R)-11; samples were analyzed for VOCs (including methyl tert-butyl ether), TPH, pesticides, PCBs, and metals. Arsenic was the

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only analyte reported in groundwater in two samples (123-0042 and 123-0043) at concentrations exceeding screening criteria.

According to the EBS, soil samples collected from the postremoval excavation pit for UST(R)-11 were found to contain gasoline, diesel, motor oil, and jet fuel at concentrations below screening criteria; groundwater samples also contained these contaminants at concentrations below EBS screening criteria. Soil samples collected during a follow-on investigation of the UST were reported to contain concentrations of gasoline, diesel, motor oil, and jet fuel at concentrations below EBS screening criteria.

No Further Action Report for UST(R)-11

Two soil samples were collected from the backhoe bucket during the removal of this UST in November 1994 (TtEMI 2002a). The soil samples were analyzed for BTEX, TPH, chlorinated hydrocarbons, and metals. A groundwater sample was also collected immediately after the excavation of the UST from the water in the excavation pit. The groundwater sample was analyzed for BTEX, TPH, chlorinated hydrocarbons, and metals. None of the analytes were reported in the soil or groundwater samples at concentrations above their screening criteria.

Two additional surface soil samples were collected from just beneath the asphalt prior to the excavation and removal of the vent line and underground piping associated with UST(R)-11 in January 1995. These samples were analyzed for BTEX, TPH, chlorinated hydrocarbons, and metals. No analytes were reported at concentrations above screening criteria.

The NFA report concluded that UST(R)-11 was adequately characterized based on EBS sampling efforts and NFA was recommended for the UST (TtEMI 2002a).

Follow-On Remedial Investigation Sampling

Two follow-on investigations occurred within the boundaries of Transfer Parcel EDC-5: one in 1994 (PRC Environmental and Montgomery 1996) and one in 1998 (TtEMI and Uribe & Associates 1998). The purpose of these investigations was to provide additional lithologic, chemical, and hydrogeologic information for selected IR sites at Alameda Point. The goals of the investigations were to assess the nature and extent of soil and groundwater contamination for an RI/FS. During these investigations, soil and groundwater samples were collected at three locations (03GB036, 03GB025, and 03GB240) in EBS Parcel 123 because of their proximity to IR Site 3. Soil and groundwater constituents were analyzed for VOCs and TPH; however, no contaminants were present at concentrations above screening criteria.

2002 Polynuclear Aromatic Hydrocarbon Study

Two soil borings (32EDC-5-90 and 32EDC-5-100) were advanced in EBS Parcel 123 during the 2002 PAH study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. Concentrations of PAHs in all soil samples from this boring were below the screening criterion.

A1.23.5.3 PROPOSED SAMPLING RATIONALE AND DESIGN

The problem statement and optimized sampling design (DQO Steps 1 and 7) proposed for EBS Parcel 123 in AOC 23 are presented in this subsection. Sitewide DQOs that apply to EBS Parcel 123 in AOC 23 are presented in Tables 1-2, 1-3, and 1-4 in the SAP.

Because the samples that were collected in Building 98 targeted the worst-case scenario for possible releases, and because SWMU AOC 098 was located indoors on top of concrete, no additional sampling was recommended in the EBS, and this area is considered to exhibit a low potential for releases. A groundwater sample collected on the downgradient side of Building 98 was analyzed for VOCs and TPH; results did not identify contaminants above screening criteria. However, limited groundwater analyses were performed.

Four borings will be advanced at Building 98. One boring will be advanced on the assumed downgradient side of Building 98 to assess whether possible releases at this building (including SWMU AOC 098) impacted soil or groundwater. One boring will be advanced north and one boring east of the building, and groundwater will be collected from a fourth boring between Buildings 98 and 13. Soil and groundwater samples from these borings will be analyzed for VOCs, TPH (purgeable-range and extractable-range), SVOCs, pesticides, PCBs, and metals.

OWS 067 is located on the south side of Building 67. No samples were targeted to assess possible releases from the OWS-impacted soil or groundwater, and the SWMU Report recommended additional sampling at this location. Therefore, one boring will be advanced adjacent to OWS 067 to assess whether possible releases from the OWS impacted soil or groundwater. Soil and discrete groundwater samples from this boring will be analyzed for VOCs, TPH (purgeable-range and extractable-range), and metals.

Soil sampling was performed at NAS GAP 15. No contaminants were identified in soil at NAS GAP 15. Discrete groundwater samples will be collected from two locations at NAS GAP 15 to address the regulatory agencies' request to target this area, and because no groundwater samples have previously been collected in this immediate area. However, groundwater samples were collected nearby at previous sample locations 123-0040 through 123-0043. Two groundwater samples will be collected, one on the north side and one on the south side of NAS GAP 15, because the groundwater flow direction in this area is uncertain. Groundwater flow direction varies across EBS Parcel 123 and AOC 23. Groundwater flow in the northern portion of AOC 23 (including EBS Parcel 123) is influenced by remediation activities at IR Site 7. Groundwater in this area flows northerly toward IR Site 7, whereas groundwater generally flows southwesterly (toward Seaplane Lagoon) in the southern portion of AOC 23 (and EBS Parcel 123). The groundwater samples from these borings will be analyzed for VOCs, TPH (purgeable-range and extractable-range), SVOCs, pesticides, PCBs, and metals.

Soil sampling identified a PCB (Aroclor 1260) in four of five samples collected at the former location of NAS GAP 29, with results above its screening criterion in the sample from the northernmost sampling location. No other contaminants were identified above screening criteria. Groundwater samples were not targeted at the former location of

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NAS GAP 29. Soil samples will be collected from two locations around the former location of this GAP to delineate the northern extent of PCBs in soil. A discrete groundwater sample will be collected from one of these borings to assess the presence of contaminants in groundwater. Soil and groundwater samples from these borings will be analyzed for PCBs and metals. Because groundwater flow is uncertain in this area, an additional discrete groundwater sample will be collected on the south side of NAS GAP 29. Groundwater from this boring will also provide information for the area north of Building 263 (as discussed below) and will be analyzed for VOCs, TPH (purgeable-range and extractable-range), SVOCs, PCBs, and metals.

Heavy stains were identified between Buildings 67 and 393; however, this area was not sampled south of NAS GAP 15 and 29. Therefore, one boring will be advanced in the stained area and soil and discrete groundwater samples will be collected. Soil and groundwater samples from this boring will be analyzed for VOCs, TPH (purgeable-range and extractable-range), SVOCs, pesticides, PCBs, and metals.

Although TPH was not identified in soil at Building 263, no other analyses were performed on the soil samples. Therefore, one boring will be advanced on the south side of Building 263 to assess the presence of contaminants in soil and groundwater, and one boring will be advanced on the west side of the railroad tracks. Soil and groundwater samples from these borings will be analyzed for VOCs, TPH (purgeable-range and extractable-range), SVOCs, pesticides, PCBs, and metals. The groundwater sample proposed on the south side NAS GAP 29 will also provide groundwater data for the area north of Building 263.

The EBS reported that soil and groundwater samples were collected at UST(R)-11 as part of the EBS and tank removal activities. Analytical results for these samples showed contaminants at concentrations below screening criteria for soil and at relatively low concentrations in groundwater (Alameda Point preliminary remediation criteria have not identified residential screening criteria for groundwater). As requested by the regulatory agencies, a soil sample and a discrete groundwater sample will be collected from two locations around UST(R)-11 to assess current conditions. These samples will be analyzed for VOCs, TPH (extractable-range), and metals. Four previous groundwater samples were collected around the UST (samples 123-0040 through 123-0043).

In summary, both soil and discrete groundwater samples will be collected at EBS Parcel 123. Soil samples will be collected from three depth intervals (0 to 2, 2 to 4, and 4 to 8 feet bgs). Groundwater samples will also be analyzed for TDS in addition to analyses described above, where sufficient water volume can be obtained. The proposed soil and discrete groundwater sampling locations for EBS Parcel 123 in AOC 23 are shown on Figure A1-22.

A1.23.6 EBS Parcel 124

EBS Parcel 124 is in the central portion of AOC 23. Four buildings were historically located on EBS Parcel 124: Buildings 13, 59, 262, and 444. Only Building 13 is currently present on the site and is in the same location as the three former building sites.

A1.23.6.1 HISTORICAL USE

EBS Parcel 124 was historically used for lumber storage (Buildings 262 and 444), as a hazardous/flammable storehouse (Building 13), and for public works maintenance storage (Building 13). In general, hazardous wastes were stored in the southern half of Building 13, and hazardous materials were stored in the northern half. During the EBS, several stains were noted inside and outside Building 13 (stains inside the building cover approximately 40 percent of the floor space in the southern portion of the building and 30 percent in the northern portion). A portion of the parcel was used for sorting trash and junkyard material (salvage and reuse).

A1.23.6.2 PREVIOUS INVESTIGATIONS

Two investigations were conducted at EBS Parcel 124, and results of these investigations are summarized below. Locations sampled in and around EBS Parcel 124 in AOC 23 are shown on Figure A1-22.

Environmental Baseline Survey

To address the stains in and around Building 13, samples were collected in the southernmost portion of the building to represent the “worst case” of stain impact (IT 2001a). Nine soil samples were collected (124-0001, -0001M, -0002M, -0003M, -0005, -0005M, -0006M, -0007M, and -0008M) in this target area and analyzed for VOCs (subsurface samples only), TPH, SVOCs, PCBs, and metals. No analytes were reported at concentrations above screening criteria.

Additional samples included two soil vapor samples collected at EBS Parcel 124 as part of the IR Site 3 investigation. Concentrations of BTEX and hydrocarbons were below reporting limits in both samples.

One surface soil sample (124-0004M) was collected outside the boundaries of EBS Parcel 124 (in EBS Parcel 110) to address the EBS concern about railroad tracks. The sample was analyzed for TPH, SVOCs, PCBs, and lead. All analytes were reported at concentrations below screening criteria.

Additional soil and groundwater samples were collected from one location in EBS Parcel 124; however, samples (071M-019, -020, and -021) from this location were collected to address environmental issues in the adjacent parcel (EBS Parcel 71) and thus are discussed in the subsection above for EBS Parcel 71.

2002 Polynuclear Aromatic Hydrocarbon Study

Two soil borings (32EDC-5-78 and 32EDC-5-79) were advanced in EBS Parcel 124 during the 2002 PAH study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. Concentrations of PAHs in all soil samples from this boring were below the screening criterion.

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A1.23.6.3 PROPOSED SAMPLING RATIONALE AND DESIGN

The problem statement and optimized sampling design (DQO Steps 1 and 7) proposed for EBS Parcel 124 in AOC 23 are presented in this subsection. Sitewide DQOs that apply to EBS Parcel 124 in AOC 23 are presented in Table 1-2 in the SAP.

A stained area in Building 13 was selected as a target area for investigation during the EBS. Results from soil samples collected in this area did not identify contaminants above screening criteria for VOCs, SVOCs, PCBs, metals, and TPH. However, groundwater was not assessed.

Three discrete groundwater samples will be collected at EBS Parcel 124; one on the assumed downgradient (southwest) side of Building 13, one on the west, and one on the north side to assess whether chemicals stored in the building have impacted groundwater. Soil samples will also be collected from the location on the western side of Building 13. The proposed sampling locations are shown on Figure A1-22.

Soil and groundwater samples will be analyzed for VOCs, purgeable-range and extractable-range TPH, SVOCs, pesticides, PCBs, and metals. Groundwater samples will also be analyzed for TDS, if sufficient volume can be obtained. Groundwater samples from the locations on the west and southwest side of Building 13 will also be analyzed for mercury using U.S. EPA Method 1631 to detect concentrations down to 0.1 ng/L.

A1.23.7 EBS Parcel 125

EBS Parcel 125 is in the southern portion of AOC 23. Building 66 is presently located on this parcel. A hazardous waste storage area (NADEP GAP 43) was historically at the southern end of Building 66. IR Site 21 is adjacent to EBS Parcel 125 to the south and is part of a larger area characterized by the presence of chlorinated hydrocarbons, PAHs, metals, and benzene contamination in groundwater and PAH contamination in soil.

A1.23.7.1 HISTORICAL USE

EBS Parcel 125 was historically used for nozzle testing and overhauling, pneumatic/hydraulic accessory testing, plant services for aircraft overhauling, an engineering laboratory, and air and engine aircraft overhauling. Chemicals stored inside Building 66 included halogenated and nonhalogenated organic chemicals, acid, monochloride methane, paint, petroleum products, and metals. Chemicals stored outside Building 66 included halogenated and nonhalogenated organic chemicals, calibration fluid, and dry-cleaning solvents.

Radioactive materials (cesium and uranium oxide) were present in the ignition shop of Building 66. Hazardous waste was stored at Building 66 (both indoors and outdoors) and included paper towels and gloves contaminated with jet propellant grade 5 (JP-5) as well as aerosol cans, oil/water residue, spent JP-5, spent ENVIROSOLV 652 with traces of JP-5, and filters contaminated with ethylbenzene, naphthalene, and oils. Hazardous wastes were stored in drums. During the EBS, stains and pools or active leaks were observed to cover approximately 90 percent of the floor of Building 66. A leaking pipe was observed on the roof of Building 66; however, the leak may have been water.

Additionally, a 10-by-3-foot stain was observed on the west side of Building 66 (location of hazardous waste storage area) during the EBS. Minor stains associated with vehicle parking were also observed during the EBS.

NADEP GAP 43 was used to store aerosol paint, solvent, lacquer, JP-5, type II fuel, oil, and trichlorotrifluoroethane. The GAP area was recommended for NFA in the SWMU Report.

A1.23.7.2 PREVIOUS INVESTIGATIONS

Four investigations were conducted at EBS Parcel 125, and results of these investigations are summarized below. Locations sampled in and around EBS Parcel 125 in AOC 23 are shown on Figure A1-22.

Environmental Baseline Survey

During the EBS, nine soil samples (125-0001, -0001M, -0002M, -0003M, -0004, -0004M, -0005M, -0006M, and -0007M) were collected from stained areas in Building 66 to assess the most likely source of impacts at the parcel (IT 2001a). Samples were analyzed for TPH and SVOCs. Only TPH as gasoline in a sample from location 125-0003M was reported at a concentration above the screening criterion.

Three soil samples (125M-001, -001M, and -001RE) were collected from one location in EBS Parcel 125 to address concerns about the storm sewer corridor. The samples were analyzed for VOCs, TPH, SVOCs, pesticides, PCBs, tributyltin, oil and grease, and metals. All analytes were reported at concentrations below screening criteria.

Operable Units 1 and 2 Data Gap Investigation

Data gap samples collected at EBS Parcel 125 were used to gather information to delineate the contaminant plumes in groundwater (TtEMI 2002c). To further define VOC and TPH plumes at IR sites in OU-1 and OU-2, groundwater samples were collected from monitoring wells and from direct-push borings. Analytical results from samples collected at one location in EBS Parcel 125 (S21-DGS-DP20) indicated the presence of vinyl chloride at concentrations above its screening criterion. The data gap report concluded that groundwater contamination (benzene, vinyl chloride, and TPH) was migrating to EBS Parcel 125 from adjacent areas (IR Sites 4, 11, and 21).

2002 Polynuclear Aromatic Hydrocarbon Study

One soil boring (32EDC-5-77) was advanced in EBS Parcel 125 during the 2002 PAH study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. Concentrations of PAHs in all soil samples from this boring were below the screening criterion.

Corrective Action Data Gap Investigation

This investigation was conducted at Alameda Point in 2001 and included the collection of additional samples at EBS Parcel 125 (TtEMI 2001b). During this investigation, soil samples were collected from one boring (EP125-01) in EBS Parcel 125 to investigate the

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potential presence of petroleum-related contaminants from historical engine-testing activities. Concentrations of petroleum-related compounds reported above detection limits did not exceed the screening criteria.

A1.23.7.3 PROPOSED SAMPLING RATIONALE AND DESIGN

The problem statement and optimized sampling design (DQO Steps 1 and 7) proposed for EBS Parcel 125 in AOC 23 are presented in this subsection. Site-wide DQOs that apply to EBS Parcel 125 in AOC 23 are presented in Table 1-2 in the SAP.

Because the samples that were collected in Building 66 targeted the worst-case scenario for possible releases, and NADEP GAP 43 was located indoors on top of concrete, it was considered in the Resource Conservation and Recovery Act facility assessment (SulTech 2004) to have a low potential for releases. However, NADEP GAP 43 was not specifically targeted for soil or groundwater sampling.

A groundwater sample was collected in the southern portion of EBS Parcel 125, adjacent to IR Site 21. Analytical results for this sample identified vinyl chloride at a concentration above its screening criterion; however, it is likely that this area has been impacted by contaminant migration from adjacent IR Site 21. This sample was from a boring located in the assumed downgradient direction from Building 66 and possibly from NADEP GAP 43; however, only limited analyses were performed.

Both soil and discrete groundwater samples will be collected at EBS Parcel 125; soil samples will be collected from three depth intervals (0 to 2, 2 to 4, and 4 to 8 feet bgs). The proposed soil and discrete groundwater sampling locations are shown on Figure A1-22.

Soil and discrete groundwater samples will be collected from five borings at EBS Parcel 125. One location will be advanced north, west, southwest of Building 66; one location will be advanced on the south side of the building, adjacent to and downgradient of NADEP GAP 43. A fifth location will be advanced beneath the southern portion of Building 66. Soil and groundwater will be collected from each location and analyzed for VOCs, TPH (purgeable-range and extractable-range), SVOCs, pesticides/PCBs, and metals. Groundwater samples will also be analyzed for mercury using U.S. EPA Method 1631 to detect concentrations down to 0.1 ng/L. Groundwater samples in the borings outside of Building 66 will also be analyzed for TDS, if sufficient volume can be obtained.

A1.23.8 EBS Parcel 126

EBS Parcel 126 is in the southern portion of AOC 23. Three buildings were historically located on EBS Parcel 126 (Buildings 99, 399, and 411). Two of these buildings still remain (Buildings 399 and 411). EBS Parcel 126 is adjacent to IR Sites 3 and 21 to the east.

A1.23.8.1 HISTORICAL USE

EBS Parcel 126 was historically used for NADEP and compressor support and as an electrical substation. During the EBS, an employee stated in an interview that the area was formerly used for smelting operations to recover aluminum (prior to the construction of Building 398 on Parcel 127). During the EBS site inspection, non-PCB-containing transformer fluid was stored in drums on a concrete pad at the electrical substation. Stains were observed below the transformer and drums on the north side of Building 411 on the concrete pads. The Phase I EBS site inspection noted that the transformers were filled with non-PCB-containing oil, and a sticker on the transformers indicated that they were sampled in 1993 (IT 2001a). However, prior to the Toxic Substances Control Act, which was promulgated in 1976, most oil-containing transformers contained PCBs. Corrosives and nonhalogenated organics (microbicides) were stored in the compressor support building. An approximately 500-square-foot oil stain was also observed at Building 399.

A1.23.8.2 PREVIOUS INVESTIGATIONS

Two investigations were conducted at EBS Parcel 126, and results of these investigations are summarized below. Locations sampled in and around EBS Parcel 126 in AOC 23 are shown on Figure A1-22.

Environmental Baseline Survey

Seven surface and subsurface soil samples (126-0001M, -0002, -0002M, -0006M, -0007, -0007M, and -00008M) were collected near the large oil stain at Building 399 during the EBS (IT 2001a). All samples were analyzed for TPH; subsurface samples were also analyzed for VOCs. In sample 126-0001M, TPH as motor oil and as diesel were reported at concentrations above screening criteria. All other TPH constituents were not reported at concentrations above screening criteria.

Four soil samples (126-0003M, -0004M, -0005, and -0005M) were collected in the open space areas of EBS Parcel 126 to address reported smelting operations and heavy stains observed (in aerial photographs). Samples were analyzed for TPH and metals. Thallium (at 126-0005) was the only analyte reported in soil at a concentration above its screening criterion.

To confirm contamination identified in previous samples, seven additional soil samples (126-0009, -0010, -0012, -0015, -0016, -0018, and -0019) and three groundwater samples (126-0011, -0017, and -0020) were collected and analyzed for TPH and SVOCs. Soil samples were also analyzed for metals. Arsenic and iron were reported above their respective screening criteria in two soil samples (126-0009 and 126-0010). All other analytes were reported at concentrations below screening criteria.

Six additional subsurface soil samples (127S-001, -001M, -011, -011M, -002, and -002M) were collected within the boundaries of EBS Parcel 126 to investigate EBS sanitary sewer concerns. Samples were analyzed for VOCs, TPH, SVOCs, pesticides, PCBs, and metals. No analytes were reported at concentrations above screening criteria in soil or groundwater.

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Operable Units 1 and 2 Data Gap Investigation

To further define VOC and TPH plumes at IR sites in OU-1 and OU-2, groundwater samples were collected from a monitoring well (398-MW1) during the data gap investigation. Although no constituents were reported at concentrations above screening criteria, data gap samples collected at the adjacent EBS Parcel 125 indicated the presence of shallow groundwater contamination (i.e., benzene and vinyl chloride) that could potentially migrate to EBS Parcel 126 from adjacent IR Sites 4, 11, and 21.

Basewide Groundwater Monitoring Program

A basewide groundwater monitoring program was implemented in 2002 and is ongoing at Alameda Point (Shaw 2004b). The purpose of the program is to inventory, assess, and evaluate the adequacy of the current monitoring well network, as well as to evaluate groundwater quality at Alameda Point. One of these monitoring wells (398-MW1) is located in AOC 23 in EBS Parcel 126. Samples collected in 2001 did not have reported concentrations in excess of screening criteria.

A1.23.8.3 PROPOSED SAMPLING RATIONALE AND DESIGN

The problem statement and optimized sampling design (DQO Steps 1 and 7) proposed for EBS Parcel 126 in AOC 23 are presented in this subsection. Sitewide DQOs that apply to EBS Parcel 126 in AOC 23 are presented in Table 1-2 in the SAP.

Soil sampling in EBS Parcel 126 during the EBS identified arsenic, iron, and thallium at concentrations above screening criteria. Groundwater samples were not analyzed for metals. Therefore, soil and discrete groundwater samples will be collected to assess the distribution of metals in soil and the presence of metals in groundwater.

A groundwater sample was collected from well 398-MW1 in the eastern portion of EBS Parcel 126. Low concentrations of TCE and tetrachloroethene were reported and are likely to be associated with VOCs in groundwater at IR Site 21. No further samples will be collected to investigate TPH because the Navy will address the sampling under the Alameda Point TPH Program's investigation of the adjacent site, CAA-3A. However, one groundwater sample will be collected from well 398-MW1 for VOC and metals analyses.

Soil and discrete groundwater samples will be collected from two borings at EBS Parcel 126. One will be located in the assumed downgradient direction of sampling locations at which metals concentrations exceeded screening criteria, and a second will be located in the northern area of the parcel. Both locations are proposed to assess the distribution of metals in soil and the presence of metals in groundwater. The presence of VOCs will also be assessed. The proposed soil and discrete groundwater sampling locations are shown on Figure A1-22.

Soil and groundwater samples will be analyzed for VOCs and metals. Groundwater samples will also be analyzed for TDS, if sufficient volume can be obtained.

A1.24 AREA OF CONCERN 24

AOC 24 is a 0.6-acre area in the southeastern portion of Transfer Parcel EDC-5, along West Trident Avenue between Orion and Hancock Streets (Figure A1-23), and is in EBS Parcel 197. The portion of the parcel covered by AOC 24 includes paved open space along the southern edge of Building 118. OWS 118 is in the eastern portion of AOC 24, although there is presently no evidence of an OWS at that location. Railroad tracks run east-west across the western portion of AOC 24. IR Site 3 is immediately south of AOC 24 and is part of a larger area characterized by groundwater contamination (chlorinated hydrocarbons, TPH, and benzene) and soil contamination (metals, PAHs, and TPH). Based on 2004 groundwater elevations (Figure 2-5 in the Work Plan), it appears that AOC 24 is generally downgradient of IR Site 3.

A1.24.1 Historical Use

EBS Parcel 197 was historically used as the location of a Navy exchange (Building 118) and the open space was used for storage. Building 118 is immediately north of AOC 24; only its southern tip extends into AOC 24. During the EBS inspection, storage of heavy duty corrosive cleaners, liquid detergent, liquefied petroleum camping fuel, propane containers, toner, floor cleaner, and floor wax were observed inside the exchange. Minor quantities of gas, antifreeze, motor oil, and aerosol paint were stored in a metal box outside Building 118. One OWS (OWS 118) was present near the southeast corner of the building (Figure A1-23). Old refrigeration equipment, wood pallets, and packaging materials were stored in the open space.

A1.24.2 Previous Investigations

Three investigations were conducted at AOC 24, and results of these investigations are summarized below. Locations sampled during previous investigations in and around AOC 24 are shown on Figure A1-23.

A1.24.2.1 ENVIRONMENTAL BASELINE SURVEY

Five locations (197-0006, 116-0007, 116-0001M, 116-0010, and 197-0002M) in the western portion of AOC 24 were sampled during the EBS (IT 2001a). One or two soil samples were collected from each location at 2 to 5 feet bgs. Groundwater samples (116-0009/116-0012 – duplicate pair) were also collected from two of these locations. Soil and groundwater samples were analyzed for a combination of the following chemicals: VOCs, SVOCs, TPH, pesticides, PCBs, and metals.

Reported metals concentrations in soil samples from 116-0001M (arsenic), -0007 (iron), and -0010 (arsenic and iron) exceeded screening criteria. Reported metals concentrations in groundwater samples from 116-0009/-0012 and -0014 (arsenic), -0012 and -0014 (aluminum), -0009 and -0014 (lead), and -0014 (thallium) exceeded screening criteria.

The OWS was identified as a target area during the EBS. One subsurface soil sample (197-0002M) was collected and analyzed for VOCs, SVOCs, metals, and TPH. None of these analytes were reported above their respective screening criteria.

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A1.24.2.2 OPERABLE UNITS 1 AND 2 DATA GAP INVESTIGATION

The OU-1 and OU-2 data gap investigation specifically targeting Transfer Parcel EDC-5 had three objectives: 1) delineation of contaminant plumes in groundwater, 2) characterization of inorganic constituents in soil and groundwater, and 3) investigation of a storm sewer exposure pathway (TtEMI 2002c). The samples from AOC 24 were collected in association with the second objective.

Two soil borings (S03-DGS-DP14 and S03-DGS-DP32) were advanced in the south-central portion of AOC 24. Soil samples were collected from four depth intervals between 0 and 8 feet bgs, and one discrete groundwater sample was also collected from each location. Soil and groundwater samples were analyzed for lead. Reported lead concentrations in soil from both locations exceeded screening criteria.

In addition, lead was reported in a groundwater sample from S04-D65-DP14 at a concentration above the screening criterion.

A1.24.2.3 2002 POLYNUCLEAR AROMATIC HYDROCARBON STUDY

One soil boring (32EDC-5-131) was advanced in AOC 24 during the 2002 PAH study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. Concentrations of PAHs in all soil samples from this boring were below the screening criterion.

A1.24.3 Proposed Sampling Rationale and Design

AOC 24 addresses a request from regulatory agencies to evaluate OWS 118. Metals concentrations in soil and groundwater in the western portion of AOC 24 will be addressed as part of IR Site 3. The following discussion presents the problem statement and optimized sampling design proposed for AOC 24 (DQO Steps 1 and 7). Sitewide DQOs that apply to AOC 24 are presented in Table 1-3 in the SAP.

One EBS soil sample targeted the OWS at AOC 24, and VOCs, SVOCs, TPH, and metals in this sample were reported below screening criteria. However, a groundwater sample was not collected near the OWS. Regulatory agencies have requested additional soil and groundwater sampling at this OWS to confirm previous soil data and to assess whether groundwater has been impacted by possible releases.

Soil and discrete groundwater samples will be collected from a boring adjacent to the OWS; three soil samples will be collected (0 to 2, 2 to 4, and 4 to 8 feet bgs). A discrete groundwater sample will be collected from this boring using the HydroPunch or an equivalent sampling method. Soil and groundwater samples from this boring will be analyzed for VOCs, extractable-range TPH, and metals. Groundwater will also be analyzed for TDS, if sufficient volume can be obtained. The boring location is shown on Figure A1-23.

A1.25 AREA OF CONCERN 25

AOC 25 is a 2.7-acre area in the southeastern corner of Transfer Parcel EDC-5 (Figure A1-24) and includes the southwestern portion of EBS Parcel 130 and all of EBS Parcel 132. The southern end of Building 90 and all of Building 503 are in AOC 25 in EBS Parcel 130. The southern portion of AOC 25 (EBS Parcel 132) consists of open space that is either paved for vehicle parking or landscaped. IR Site 3 is immediately west of AOC 25 and is part of a larger area characterized by groundwater contamination (chlorinated hydrocarbons, TPH, and benzene) and soil contamination (metals, PAHs, and TPH). IR Site 4 is located immediately west and south of AOC 25 and is part of an area of known metals, TPH, and PAH contamination in soil and chlorinated hydrocarbons, PAH, benzene, and TPH contamination in groundwater.

A1.25.1 Historical Use

EBS Parcel 130 was historically used as the location of gate houses (Building 503 and former Buildings 70A, 70B, and 504), guard shacks, and an administration office (Building 90). The following chemicals were stored at the administration office: furniture polish, latex paint, bleach, joint compound, insecticide, detergent, toilet soap, stainless steel polish/cleaner, and ammonia. Cleaning solvents were also stored on asphalt under the outdoor stairs of the administration building. A 3-by-3-foot oily stain was observed inside one of the gate houses during the EBS. Minor stains associated with vehicle parking were also observed.

EBS Parcel 132 was historically used for agriculture. One temporary structure used as a police office trailer was present on the parcel during the EBS inspection. No stains were observed; however, the EBS reported that a large stained area approximately 120 by 40 feet in the southern portion of the parcel was observed on aerial photographs. The source of the stains is unknown.

A1.25.2 Previous Investigations

Five investigations were conducted at AOC 25, and results of these investigations are summarized below. Locations sampled in and around AOC 25 are shown on Figure A1-24.

A1.25.2.1 ENVIRONMENTAL BASELINE SURVEY

During the EBS, samples collected at AOC 25 included 17 soil samples (132-0001, -0001M, -0002, -0002M, -0003, -0003M, -0004, -0004M, -0005M, -0006M, -0007, -0007M, -0008, -0008M, -0009M; 132S-001 and -001M) collected at EBS Parcel 132 and two soil samples (130M-001 and 130M-001M) collected at EBS Parcel 130 (IT 2001a). The purpose, depths, and analytes for the samples collected during the EBS were as follows.

- Samples 132-001, -0001M, -0002, -0002M, -0003, -0003M, -0004, and -0004M addressed possible contamination in the area of the historical stain (at the administration office). Soil samples were collected from 0 to 1 foot bgs and analyzed for TPH, pesticides, and metals.

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- Samples 132-0005M, -0006M, -0007, -0007M, and -0009M addressed the possibility of contamination related to emissions from nearby Building 360 (a building located in EBS Parcel 143 formerly used for painting, blasting, heat-treating, welding, and plating). Soil samples were collected from 0 to 1 foot bgs and analyzed for metals.
- Samples 132-0008 and 132-0008M addressed contamination potentially associated with the railroad tracks. Soil samples were collected from 0 to 0.5 foot bgs and analyzed for TPH, SVOCs, PCBs, and lead.
- Samples 132S-0001 and 132S-0001M addressed contamination potentially associated with the sanitary sewer line. Soil samples were collected from 0 to 6.5 feet bgs and analyzed for SVOCs and metals.
- Samples 130M-001 and 130M-0001M addressed contamination potentially associated with the sanitary sewer line. Soil samples were collected from 0 to 9 feet bgs and analyzed for TPH, SVOCs, pesticides/PCBs, oil and grease, and lead.

Reported TPH concentrations in soil sample 132-0004M exceeded screening criteria; however, TPH was below screening criteria in a duplicate sample. Reported arsenic concentrations in soil samples 130M-001M and 132M-0006M exceeded its screening criterion. However, the Site Inspection Report for Transfer Parcel EDC-5 noted that the concentrations of arsenic (9.6 mg/kg and 8.8 mg/kg) in these samples are similar to the background concentration (8.7 mg/kg). Other reported analyte concentrations in soil did not exceed screening criteria.

A1.25.2.2 REMEDIAL INVESTIGATION/FEASIBILITY STUDY DATA TRANSMITTAL MEMORANDUM FOR SITES 4, 5, 8, 10A, 12, AND 14

One HydroPunch sample (DHP-S03-03) was collected in the northern portion of AOC 25 as part of the OU-1 RI follow-on sampling conducted in 1994 (PRC Environmental and Montgomery 1996). Groundwater from DHP-S03-03 was analyzed for VOCs and metals. Concentrations of cadmium and thallium reported in the groundwater sample exceeded screening criteria.

A1.25.2.3 OPERABLE UNITS 1 AND 2 DATA GAP INVESTIGATION

The OU-1 and OU-2 data gap investigation specifically targeting Transfer Parcel EDC-5 had three objectives: 1) delineation of contaminant plumes in groundwater, 2) characterization of inorganic constituents in soil and groundwater, and 3) investigation of a storm sewer exposure pathway (TiEMI 2002c). Samples collected in AOC 25 were conducted in association with the second objective.

Three soil borings (S03-DGS-DP04, -DP05, and -DP07) were advanced in the northern portion of AOC 25. One or two soil samples were collected from each boring between 0 and 5 feet bgs. One discrete groundwater sample was also collected from each boring location. Samples collected from S03-DGS-DP04 and S03-DGS-DP05 were analyzed for VOCs, TPH, and naphthalene. Samples collected from S03-DGS-DP07 were

analyzed for organolead and lead. Reported analyte concentrations in soil and groundwater did not exceed screening criteria.

A1.25.2.4 BASEWIDE GROUNDWATER MONITORING PROGRAM

Two wells located in AOC 25 are part of the basewide groundwater monitoring program: well MBG-3 and well M03-11 (Shaw 2004b).

Well MBG-3 is located in the southwestern portion of AOC 25. Four soil samples were collected from this location at four depth intervals between 0 and 8 feet bgs during well installation. Additionally, two groundwater samples were collected from this well in 1998, 2002, 2003, and 2004 and analyzed for VOCs, TPH, SVOCs, pesticides, PCBs, and metals. Arsenic was the only constituent reported in groundwater at a concentration exceeding its screening criterion. No analytes in soil were reported at concentrations above screening criteria.

Well M03-11 is located in the southwestern portion of AOC 25. Groundwater samples were collected from this well in 2002, 2003, and 2004 and were analyzed for VOCs, TPH, SVOCs, and metals. Arsenic was the only constituent reported in groundwater at concentrations exceeding its screening criterion.

A1.25.2.5 2002 POLYNUCLEAR AROMATIC HYDROCARBON STUDY

One soil boring (32EDC-5-128) was advanced in the southwestern portion of AOC 25 during the 2002 PAH study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. Concentrations of PAHs in all soil samples from this boring were below the screening criterion.

A1.25.3 Proposed Sampling Rationale and Design

The sampling plan for AOC 25 primarily addresses metals in groundwater. The following discussion presents the problem statement and optimized sampling design proposed for AOC 25 (DQO Steps 1 and 7). Sitewide DQOs that apply to AOC 25 are presented in Table 1-2 in the SAP.

Previous investigations identified metals in groundwater, notably thallium, cadmium, and arsenic, north of Building 503 at concentrations above screening criteria and arsenic above its screening criterion in the southern portion of AOC 25. Soil and discrete groundwater samples will be collected at AOC 25 to assess the distribution of thallium north of Building 503. These data will be used to characterize the nature and extent of contamination, conduct an HHRA for this area, and support an FS.

Discrete groundwater samples will be collected from three borings north of Building 503 and one boring in the southern portion of AOC 25 to evaluate the distribution of metals in soil and groundwater. In addition, three soil samples (0 to 2, 2 to 4, and 4 to 8 feet bgs) will be collected from each boring near Building 503. The proposed soil and discrete groundwater sampling locations are shown on Figure A1-24.

Soil and groundwater samples will be analyzed for metals. The groundwater sample in the southern portion of AOC 25 will also be analyzed for TPH (extractable-range and

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purgeable-range) to assess concentrations downgradient of the soil TPH exceedance. Groundwater samples will also be analyzed for TDS, if sufficient volume can be obtained.

A1.26 DATA GAP AREAS

This section discusses data gap areas (EBS Parcels 78, 79, and 205) in Transfer Parcel EDC-5 that have been identified by the regulators as requiring further soil and/or groundwater sampling data in order to characterize any potential contamination. The data gap areas were not identified as part of the site inspection process and therefore were not defined as AOCs. Because EBS Parcels 78 and 79 are contiguous, they are discussed together.

A1.26.1 EBS Parcels 78 and 79

EBS Parcels 78 and 79 are data gap areas in the east-central portion of Transfer Parcel EDC-5. EBS Parcel 78 is a 1.5-acre area and EBS Parcel 79 is a 1.7-acre area (Figure A1-25). Buildings and structures present on these parcels include the following.

Four buildings (Buildings 73A, 73B, 131, and 607) were historically located in EBS Parcel 78. Currently, two buildings are located in EBS Parcel 78. Building 607 presently houses the Alameda Point collaborative. A modular building for Alameda Head Start (an active child care facility) is located where former Building 73B used to be located.

Two structures (Structures 36A and 624) were historically located in EBS Parcel 79. Structure 36A was a 150-foot radio tower that was removed in November 2002 (Shaw 2003); a new antenna structure is now in place at this location. Structure 624 is still present, but its current use is unknown. The remainder of the parcel is currently an asphalt-paved parking area and a playground.

EBS Parcels 78 and 79 were identified as data gap areas in response to a request from the Alameda Point Collaborative to U.S. EPA.

A1.26.1.1 HISTORICAL USE

EBS Parcel 78 was historically used as the location of a parking structure, for navigational training, for arts and crafts, and as a hobby shop specifically for ceramics and woodworking. Chemical storage at EBS Parcel 78 included paint, general cleaning supplies, wood finish, ceramic glaze, antifreeze, fuel, and lubricants. All chemicals were stored indoors; no stains were noted during the EBS. The open space consisted of paved and grassy areas. Only a 1-square-foot stain and minor stains associated with vehicle parking were observed. A leak from the air compressor was also observed during the EBS. No potential release areas were identified.

EBS Parcel 79 was historically used as the location of a communications center (Building 624) and a radio tower (Structure 36A). During the EBS, no chemical storage was observed at the parcel; only minor stains associated with vehicle parking were observed and no potential release areas were identified.

A1.26.1.2 PREVIOUS INVESTIGATIONS

Two investigations included the collection of samples at EBS Parcels 78 and 79, and results of these investigations are summarized below. Locations sampled during previous investigations at and near EBS Parcels 78 and 79 are shown on Figure A1-25.

2002 Polynuclear Aromatic Hydrocarbon Study

One soil boring (32EDC-5-70) was installed in EBS Parcel 79 during the 2002 PAH study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. PAH concentrations did not exceed the soil screening criterion.

Lead Removal Action

Based on potential historical use of LBP and elevated lead concentrations in soil samples collected near two water towers near EBS Parcels 78 and 79, an investigation was conducted to determine the extent of lead contamination surrounding a number of structures, including the radio antenna tower (Structure 36A) located in EBS Parcel 79 (TtEMI 2002b).

The investigation included one composite soil sample collected adjacent to former Structure 36A (removed during a subsequent removal action [see next paragraph], and thus not shown on Figure A1-25) and two additional soil samples from EBS Parcel 78 (SS-73B0-E and SS-607-E), immediately west of EBS Parcel 79. Results from these samples were analyzed during the EE/CA in 2002 (TtEMI 2002b). The EE/CA presented a framework for evaluating the best remedial technologies to address LBP on the antenna tower and lead-impacted soil near Structure 36A. During the EE/CA, a site-specific human-health RAO of 199 mg/kg was developed for lead using the DTSC LeadSpread 7 model. The concentration of lead in the sample collected adjacent to former Structure 36A in EBS Parcel 79 exceeded the RAO; lead concentrations reported in the two samples collected in EBS Parcel 78 did not exceed the RAO.

Based on these results, an NTCRA was conducted by the Navy between November 2002 and July 2003 (Shaw 2003). During this NTCRA, soil was removed from the area around former Structure 36A in EBS Parcel 79. The triangular removal area measured approximately 36 feet on each side and extended to approximately 2 feet bgs. Approximately 21 cubic yards of soil was removed. Confirmation sampling was conducted during the NTCRA. Shallow soil samples were collected from these borings to approximately 1 foot bgs and analyzed for metals. Nine confirmation soil borings installed around former Structure 36A that were not removed are shown on Figure A1-25 (Parcel 79 Grid 1 through 9). The results of confirmation sampling indicated that lead concentrations subsequent to the NTCRA were below the established RAO. As a result, no additional action was recommended for EBS Parcel 79.

A1.26.1.3 PROPOSED SAMPLING RATIONALE AND DESIGN

The following sampling design was developed to address issues raised by the Alameda Point Collaborative regarding EBS Parcels 78 and 79 and to generate data to satisfy the

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DQOs. Sitewide DQOs that apply to EBS Parcels 78 and 79 are presented in Table 1-2 in the SAP.

Soil and discrete groundwater samples will be collected at four locations in EBS Parcel 78 and at four locations in EBS Parcel 79 in an unbiased modified grid pattern. Sampling locations will be adjusted to locations outside existing buildings or structures, although no release to soil or groundwater is known to have occurred; these samples will be used to assess whether soil or groundwater concentrations of several chemicals exceed screening criteria. Soil samples will be collected at three depth intervals (0 to 2, 2 to 4, and 4 to 8 feet bgs). A discrete groundwater sample will be collected from each boring. The proposed boring locations are shown on Figure A1-25.

All soil and groundwater samples will be analyzed for VOCs, TPH (purgeable-range and extractable-range), SVOCs, pesticides, PCBs, and metals. Groundwater samples will also be analyzed for TDS, if sufficient volume can be obtained.

A1.26.2 EBS Parcel 205

EBS Parcel 205 is a 0.1-acre data gap area along the southeastern border of Transfer Parcel EDC-5 (Figure A1-26). Four buildings were historically located on the parcel: Buildings 507, 508, 523, and 605. Currently there are no buildings present on the site; only their concrete pads remain.

A1.26.2.1 HISTORICAL USE

EBS Parcel 205 was used as part of a flight test area for aircraft. Buildings at EBS Parcel 205 were used for storage of various items including personal equipment, electrical parts, tools, and batteries. Additionally, various chemicals including oils and nonchlorinated organic chemicals were reported to have been stored inside buildings and in outdoor storage lockers. Chemicals were noted as being labeled and stored correctly and adequately.

Stains were observed in two open space areas during the EBS, including a small stain (1 by 2 feet) near Building 523 and two larger stains (4 square feet each) on the west side of Building 507. Additionally, one stain (approximately 3 by 4 feet) was observed in the southwest corner inside Building 507 during the EBS; because this stain was indoors, it was considered to be a minor cause for concern.

The SWMU site located in EBS Parcel 205 is a GAP that was historically used for storing containers of JP-5 and engine, lubricating, and hydraulic oils. The EBS and PEP listed the location of this SWMU as east of Building 523 and stated that there were no known releases at NADEP GAP 73. The SWMU Report gave this location as north of Building 507, which contradicts the location listed in the EBS and PEP. The SWMU was recommended for NFA in a November 1999 letter to DTSC (SulTech 2005a).

A1.26.2.2 PREVIOUS INVESTIGATIONS

Two investigations included the collection of samples at EBS Parcel 205, and results of these investigations are summarized below. Locations sampled during previous investigations at and near EBS Parcel 205 are shown on Figure A1-26.

Environmental Baseline Survey

Three soil samples (205-0001M, -0002, and -0002M) were collected just outside the boundary of EBS Parcel 205, in the larger of the stained areas, and analyzed for TPH and metals (IT 2001a). These analytes were reported at concentrations below screening criteria.

2002 Polynuclear Aromatic Hydrocarbon Study at Alameda Point

Four soil borings (C3P205B001 through C3P205B004) were advanced in EBS Parcel 205 during the 2002 PAH study (BEI 2005a). Samples were collected from four depth intervals between 0 and 8 feet bgs and analyzed for PAHs. PAH concentrations from these soil samples did not exceed the screening criterion.

A1.26.2.3 PROPOSED SAMPLING RATIONALE AND DESIGN

At the request of the regulatory agencies, EBS Parcel 205 was identified as a data gap area due to the presence of NADEP GAP 73. The 2005 SWMU Report identified NADEP GAP 73 as located north of Building 507; however, the EBS identified this SWMU as located at Building 523.

Soil and discrete groundwater samples will be collected from two borings at EBS Parcel 205: one in the stained area southwest of NADEP GAP 73 reported to be in the northwest portion of EBS Parcel 205, and one adjacent to the reported location on NADEP GAP 73 in the southeast portion of EBS Parcel 205. Both locations are proposed to assess whether soil and groundwater have been impacted by possible releases from this GAP. Three soil samples will be collected from each boring (0 to 2, 2 to 4, and 4 to 8 feet bgs). A discrete groundwater sample will also be collected from this boring. This proposed sampling location is shown on Figure A1-26.

Soil and groundwater samples will be analyzed for VOCs, TPH (purgeable-range and extractable-range), and metals. Groundwater will also be analyzed for mercury using U.S. EPA Method 1631 to detect concentrations down to 0.1 ng/L and, if sufficient volume can be obtained, for TDS.

A1.27 SOLID WASTE MANAGEMENT UNITS

This section addresses nine SWMUs located in Transfer Parcel EDC-5 that are being assessed separately from those located in the AOCs. The subsections below provide descriptions of these SWMUs, including location, historical uses, previous investigations, and the proposed sampling rationales and designs.

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A1.27.1 Solid Waste Management Unit Locations and History

This section provides location and description information for nine SWMUs included for evaluation in this Work Plan. The generalized SWMU locations are shown on Figure A1-1.

- OWS 017 was an OWS pit reported to be located in EBS Parcel 80, on the south side of Building 17 (bachelor officers' quarters), near the western wing. The OWS is described as a 4-by-8-foot oil trap located behind a former kitchen (SulTech 2005a). The OWS contained trash, water, and oil but did not contain hazardous materials. The area is presently covered by a rectangular concrete pad measuring approximately 10 by 15 feet (Figure A1-27).
- AST 016 is a 360-gallon diesel AST built into a generator located east of the parking lot on the east side of Building 16 in EBS Parcel 83 (Figure A1-28). The outer steel walls of the base of the generator act as secondary containment for this AST (SulTech 2004).
- AST 039 was a 1,000-gallon diesel AST reportedly located in EBS Parcel 70 near the southeastern corner of Building 39 (Figure A1-29). This AST was removed in November 1998 (SulTech 2004). No evidence of this AST was observed during a site walk conducted in August 2005.
- AST 152 was a 50-gallon fuel oil AST located on the northeastern corner of Building 152 in EBS Parcel 102; stains were noted near the AST during Phase I site inspection (IT 2001a). This AST was removed between 1995 and 2002 (SulTech 2004). The AST has been removed; two concrete pads are visible at the former location of the AST 152 (Figure A1-30).
- ASTs 173A, -B, and -C are three 100-gallon steel diesel ASTs (associated with back-up generators) located east of Building 173 in EBS Parcel 115 (Figure A1-31); stains were observed in the containment near the middle tank (IT 2001a). Minor stains were visible near the pipe and tank connections, which may indicate that leaks may have occurred in the past (Figure A1-31) (SulTech 2004).
- AST 392 was a 200-gallon diesel AST located south of Building 392 in EBS Parcel 189 that was removed between 1992 and 1994 (Figure A1-32) (SulTech 2004).
- UST(R)-11 (Tank 393) was a 600-gallon waste-oil UST located in EBS Parcel 123 that was removed in 1994. This SWMU was located within the boundaries of AOC 23 and is discussed in greater detail in Section A1.23 (Figure A1-33).

A1.27.2 Previous Investigations

The SWMU Report for Transfer Parcel EDC-5 and the AST assessment report summarize results of all past assessments and investigations of the SWMUs at Transfer Parcel EDC-5 (SulTech 2004, 2005a). Locations sampled during previous investigations within 100 feet of each SWMU are shown on Figures A1-27 through A1-33; however, only those samples collected in close proximity of the SWMUs are described below.

- **OWS 017.** Two soil samples were collected near OWS 017 at CC40 and DD40 during the PAH TCRA. Soil samples were collected from a depth interval of 1 to 1.5 feet bgs and were analyzed for PAHs. Reported concentrations were below the screening criterion. The SWMU Report recommended NFA for OWS 017.
- **AST 016.** Sampling has not been conducted in the vicinity of the AST. The AST assessment report noted that there were no signs of leaks or stains during a July 2004 site visit and recommended the AST for closure in place (SulTech 2004).
- **AST 039.** Soil samples have not been collected near AST 039; however, several soil samples were collected within approximately 100 feet of the AST during the 2002 PAH study and the EBS. During the PAH study, four soil samples were collected at 0 to 8 feet bgs from 32EDC-5-27 and were analyzed for PAHs. During the EBS, soil samples were collected as follows:
 - 070-0012M from 3 to 3.5 feet bgs; analyzed for VOCs
 - 070-0031M/13M from 0 to 0.5 and 3 to 3.5 feet bgs; analyzed for TPH and VOCs, respectively
 - 070-0014M from 3 to 3.5 feet bgs; analyzed for VOCs
 - 070-0032M/15M from 0 to 0.5 and 3 to 3.5 feet bgs; analyzed for TPH and VOCs, respectively
 - 195-0025 from 2.5 to 3.5 feet bgs; analyzed for VOCs and metals

One groundwater sample (195-0024) was also collected from the area during the EBS and was analyzed for VOCs, TPH, and SVOCs. Reported soil and groundwater concentrations did not exceed screening criteria.

AST 039 was recommended for NFA in the AST assessment report.

- **AST 152.** Soil samples were collected near AST 152 during the EBS. Two soil samples (102-0001M and 102-0002M) were collected from 0.5 to 1 and 1 to 1.5 feet bgs, respectively, beneath the stained area near the AST and were analyzed for TPH. Reported concentrations did not exceed screening criteria. AST 152 was recommended for NFA in the AST assessment report.
- **ASTs 173A, 173B, and 173C.** Two surface soil samples (115-0001M and 115-0002) were collected from the area (focused in the area around the apparent surface spill) and analyzed for TPH. Reported concentrations of motor oil exceeded screening criteria. ASTs 173A, -B, and -C were recommended for closure in place in the AST assessment report.
- **AST 392.** Soil samples were collected near AST 392 during the EBS. Soil samples were collected from 189-0001 through 189-0004 at depths from 0 to 5 feet bgs and were analyzed for one or more of the following: VOCs, TPH, SVOCs, and metals. Reported concentrations did not exceed screening criteria.

AST 392 received NFA closure from the San Francisco Bay Regional Water Quality Control Board (RWQCB) in September 2001 (SulTech 2004). AST 392 was recommended for NFA in the AST assessment report.

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- **UST(R)-11.** Because this SWMU is located in AOC 23, detailed information on previous investigations at UST(R)-11 is presented in Section A1.23.

A1.27.3 Proposed Sampling Rationale and Design

The regulatory agencies have requested further evaluation of these nine SWMUs as part of the IR Site 35 RI. The following discussion presents the problem statement and optimized sampling design proposed for these SWMUs (DQO Steps 1 and 7).

- OWS-specific issues will follow DQOs presented in Table 1-3 in the SAP. Soil and discrete groundwater samples will be collected from one boring adjacent to and on the assumed downgradient (where possible) side of OWS 017; two soil samples will be collected from the boring (0 to 2 and 2 to 4 feet bgs). A discrete groundwater sample will also be collected from the soil boring. Soil and groundwater samples will be analyzed for VOCs, extractable-range TPH, and metals. Groundwater samples will also be analyzed for TDS, if sufficient volume can be obtained.
- AST/UST-specific issues will follow DQOs presented in Table 1-4 in the SAP. Soil and discrete groundwater samples will be collected from one boring at ASTs 016, 039, 152, and 392. The borings will be adjacent to and on the assumed downgradient side, where possible, of each AST. Soil samples and one discrete groundwater sample will be collected from one boring at ASTs 173A, -B, and -C adjacent to the middle AST (173B). Soil samples will be collected at two depths from each boring (0 to 2 and 2 to 4 feet bgs). Soil and groundwater samples will be analyzed for VOCs and TPH (extractable-range). Groundwater samples will also be analyzed for TDS, if sufficient volume can be obtained. Proposed sampling at UST(R)-11 is described in Section A1.23.5.3 under AOC 23, EBS Parcel 123.

The Navy wrote a letter dated July 26, 2005, to DTSC and the San Francisco Bay RWQCB requesting that ASTs 016, 039, 152, 173A, 173B, 173C, and 392 be removed from the list of SWMUs evaluated in Transfer Parcel EDC-5 list because they were known to contain only petroleum hydrocarbons rather than waste material, and thereby met the CERCLA petroleum exclusion criteria. The DTSC responded in a letter dated August 25, 2005, and acknowledged that this issue falls under the jurisdiction of the RWQCB.

The timing for resolving the Navy's request is not yet known. This Work Plan proposes an option for the collection and analysis of soil and discrete groundwater samples to assess possible impact from these tanks if the Navy should decide to confirm soil and groundwater conditions prior to resolution of its request. If the Navy's request is approved and these samples are not collected, then a field change request will be submitted.

A1.28 POLYNUCLEAR AROMATIC HYDROCARBON AREAS

PAH areas identified for inclusion in the FS address residual B(a)P equivalent concentrations that are above the Alameda Point screening criterion of 620 micrograms per kilogram ($\mu\text{g}/\text{kg}$) but do not drive risk above 10^{-5} . The PAH areas overlap some

AOCs. These areas may be refined during the RI/FS, and some of the AOCs that were identified solely because of the presence of PAHs may be incorporated into the PAH areas. As currently designated, the PAH areas cover a total of 36.7 acres.

No additional samples are proposed in the PAH areas that are outside of AOCs. Also, as agreed upon with U.S. EPA on November 14, 2005, baseline risks will not be calculated for the PAH areas.

A1.28.1 Historical Use

The PAH areas are located primarily in the north and central portions of Transfer Parcel EDC-5, in the West Housing Area, with a limited number of other locations outside the family housing area (Figure A1-34).

A1.28.2 Previous Investigations

Two investigations included the collection of samples for PAH characterization. Additionally, a PAH TCRA was performed. Results of these investigations and the TCRA are summarized below. Locations sampled during previous investigations and the areas subject to the TCRA are shown on Figure A1-34. Analytical results for soil samples collected within the PAH areas are summarized in Table A2-45 (included on CD in Appendix A2 to the SAP).

A1.28.2.1 OPERABLE UNIT 5 ADDENDUM SAMPLING

Samples were collected within IR Site 35 as part of the OU-5 Addendum activities conducted in 2001 in support of the OU-5 RI (IT 2001b). Samples of fill material were collected at AOCs 7 and 14 in IR Site 35 and analyzed for PAHs. B(a)P equivalent concentrations were calculated and compared to the Alameda Point-specific residential soil screening criterion of 620 µg/kg (DON 2001a). B(a)P equivalent concentrations exceeded that criterion at several locations, as shown on Figure A1-34.

A1.28.2.2 POLYNUCLEAR AROMATIC HYDROCARBON STUDIES AT ALAMEDA POINT

In 2002 and 2003, BEI conducted two separate PAH-related investigations that included the collection of soil samples within the boundaries of IR Site 35. The 2002 PAH study was included as Appendix D of the Site Inspection Report for Transfer Parcel EDC-5 (BEI 2005a). Results of the 2003 PAH sampling investigation were included in the Field Activity Report, Assessment of PAH Contamination at Selected CERCLA Sites and EBS Parcels (BEI 2004).

The 2002 PAH study was designed to characterize PAH concentrations in fill soil at transfer parcels with no known releases. Soil samples were collected at four depths from each location (0 to 0.5, 0.5 to 2, 2 to 4, and 4 to 8 feet bgs). Based on findings of the 2002 PAH study (BEI 2005a), soil removals were conducted at IR Site 35, as discussed further in Section A1.28.2.3.

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A second PAH-specific soil sampling event was conducted at 19 IR sites and 3 EBS parcels at Alameda Point in 2003 (BEI 2004). The purpose of the investigation was to collect sufficient data to identify possible PAH contamination at the IR sites and EBS parcels. Reported concentrations of PAHs in soil samples were above screening criteria in AOCs 2, 4, 6, 7, 13, 14, 15, 16, 17, and 23, as well as some areas within Transfer Parcel EDC-5 that are outside these AOCs. For PAHs, B(a)P equivalent concentrations were calculated and compared to the Alameda Point-specific residential soil screening criterion of 620 µg/kg (DON 2001a). Areas recommended for further evaluation in the SI Report included those areas where a cancer risk above 10^{-5} was associated with PAHs.

Some areas that were not carried forward as AOCs (those areas with a cancer risk associated with PAHs at or below 10^{-5}) had individual samples with B(a)P equivalent concentrations above 620 µg/kg. The Navy and regulatory agencies are considering how to address the presence of residual PAHs in soil at Alameda Point. This issue and how it relates to Transfer Parcel EDC-5 will be discussed in the RI/FS report.

A1.28.2.3 POLYNUCLEAR AROMATIC HYDROCARBON REMOVAL ACTION

PAH concentrations were reported above the Alameda Point-specific residential soil screening criterion (620 µg/kg) in soil samples collected from portions of IR Site 35 during the 2002 PAH study. This prompted the Navy to conduct a TCRA of the top 2 feet of soil in the West Housing Area (Foster Wheeler 2004). Soil removals in that area were conducted using a grid pattern at EBS Parcels 62, 96, 97 (AOC 4), 80 (AOC 9), 98 (AOCs 5, 7, and 8), and 103 (AOCs 13, 14, and 18). Locations of PAH removal areas relative to IR Site 35 are shown on Figure A1-34.

A1.29 REFERENCES

- Bechtel Environmental, Inc. 2004. Field Activity Report Assessment of PAH Contamination at Selected CERCLA Sites and EBS Parcels, Alameda Point, Alameda, California. April.
- . 2005a. Polynuclear Aromatic Hydrocarbon Field Activity Summary. Included as Appendix D of the Site Inspection Report for the Transfer Parcel EDC-5. March.
- . 2005b. Final Site Inspection Report. Transfer Parcel EDC-5. Alameda Point, Alameda, California. March.
- BEI. See Bechtel Environmental, Inc.
- Cal/EPA. 2005. Interim Final Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, prepared by the California Regional Water Quality Control Board, San Francisco Bay Region, issued February and updated in March.
- Department of the Navy. 2001a. Draft Polynuclear Aromatic Hydrocarbon Technical Meeting. Meeting Minutes. May 31.
- . 2001b. Preliminary Remediation Criteria and Closure Strategy for Petroleum-Contaminated Sites at Alameda Point, Alameda, California. May.

-
- . 2005. Telephone conference calls between the Navy and U.S. EPA on November 14 and between the Navy and DTSC on November 17 and 21. November.
- DON. *See* Department of the Navy.
- ERM-West. 1994a. Final Environmental Baseline Survey/Community Environmental Response Facilitation Act Report for NAS/NADEP Alameda. October.
- . 1994b. Parcel Evaluation Plans. NAS/NADEP Alameda, California. (Prepared 1994 through 1995.)
- Foster Wheeler. *See* Foster Wheeler Environmental Corporation.
- Foster Wheeler Environmental Corporation. 2004. Final Project Close-Out Report. CERCLA Time-Critical Removal Action at West Housing Area, Alameda Point, Alameda, California. May 15.
- Innovative Technical Solutions, Inc. 2005. Spring 2005 Alameda Basewide Annual Groundwater Monitoring Report, Alameda Point, Alameda, California. July.
- International Technology Corporation. 2001a. Environmental Baseline Survey Data Evaluation Summary – Final, Alameda Point, California. January.
- . 2001b. Draft Field Summary Report for the Operable Unit 5 Addendum Activities (Parcels 98, 99, 100, 103, 178, and the North Village Housing Area) Alameda Point, Alameda. July 23.
- . 2002. Completion Report, Underground Fuel Line Abandonment, Alameda Point, Alameda, California. August 27.
- IT. *See* International Technology Corporation.
- ITSI. *See* Innovative Technical Solutions, Inc.
- PRC Environmental and Montgomery. *See* PRC Environmental Management, Inc., and J.M. Montgomery.
- PRC Environmental Management, Inc., and J.M. Montgomery. 1992. Final Data Summary Report RI/FS Phases 2B and 3, Volume 1 of 2, NAS Alameda, Alameda, California. October 27.
- . 1996. Final RI/FS Data Transmittal Memorandum for Sites 4, 5, 8, 10A, 12, and 14. April.
- Shaw. *See* Shaw Environmental, Inc.
- Shaw Environmental, Inc. 2003. Site Closure Report. Parcels 79, 98, 105, 106, and 107 Non-Time-Critical Removal Action. Revision 0. Alameda Point, Alameda, California. November 4.
- . 2004a. Final Removal Action Site Closeout Report. Revision 1. Time-Critical Removal Action for Building 195 Pesticide Shed Demolition and Soil Removal. Alameda Point, Alameda, California. February 5.

Appendix A1 Study Areas at IR Site 35

- . 2004b. Final Work Plan for Basewide Groundwater Monitoring Program. Alameda Point, Alameda, California.
- SulTech. *See* SulTech, a Joint Venture of Sullivan Consulting Group, and Tetra Tech EM Inc.
- SulTech, a Joint Venture of Sullivan Consulting Group, and Tetra Tech EM Inc. 2004. Draft Petroleum Aboveground Storage Tanks Assessment and Closure Request, Alameda Point, Alameda, California. November 30.
- . 2005a. Solid Waste Management Unit Evaluation Report for Transfer Parcel EDC-5. Published as Attachment A to Final Site Inspection Report, Transfer Parcel EDC-5 (BEI), 2005. March.
- . 2005b. Feasibility Study Report for Operable Unit 1, Sites 6, 7, 8, and 16, Alameda Point, Alameda, California. June 15.
- Tetra Tech EM Inc. 2000. Final Fuel Pipeline Oversight and Sampling Report, Alameda Point, Alameda, California. May 11.
- . 2001a. Draft Final Storm Sewer Study Report, Total Petroleum Hydrocarbon Addendum, Alameda Point, Alameda, California. Prepared for the Department of the Navy, Southwest Division, Naval Facilities Engineering Command, San Diego, California. January 15.
- . 2001b. Summary Report, Data Gap Investigation at Corrective Action Areas and Other Locations at Alameda Point, Alameda Point, Alameda, California. March 2.
- . 2001c. Summary of Background Concentrations in Soil and Groundwater, Alameda Point, Alameda, California. Prepared for the United States Department of the Navy, Southwest Division Naval Facilities Engineering Command, San Diego, California. November.
- . 2002a. Internal Draft: No Further Action Report Request for No Further Action Underground Storage Tank 393. March 25.
- . 2002b. Draft/Final Water Tower and Antenna Sites Lead Removal Action Engineering Evaluation and Cost Analysis, Alameda Point, Alameda, California. May 21.
- . 2002c. Data Summary Report, Supplemental Remedial Investigation Data Gap Sampling for Operable Units 1 and 2. Prepared for the Department of the Navy, Southwest Division Naval Facilities Engineering Command, San Diego, California. July 25.
- . 2002d. Draft Supplemental Environmental Baseline Survey, Alameda Point, Alameda, California. August 16.
- . 2004. Final Remedial Investigation Report, Sites 6, 7, 8, and 16, Alameda Point, Alameda, California. November 18.
- Tetra Tech EM Inc. and Uribe & Associates. 1998. Data Summary Report, Quarterly Groundwater Monitoring, November 1997–August 1998.
- TtEMI. *See* Tetra Tech EM Inc.

United States Environmental Protection Agency. 2002. Preliminary Remediation Goal Tables.

U.S. EPA Region 9. Available at

<http://www.epa.gov/region09/waste/sfund/prg/index.htm>. October.

———. 2004. Preliminary Remediation Goal Tables. U.S. EPA Region 9. Available at

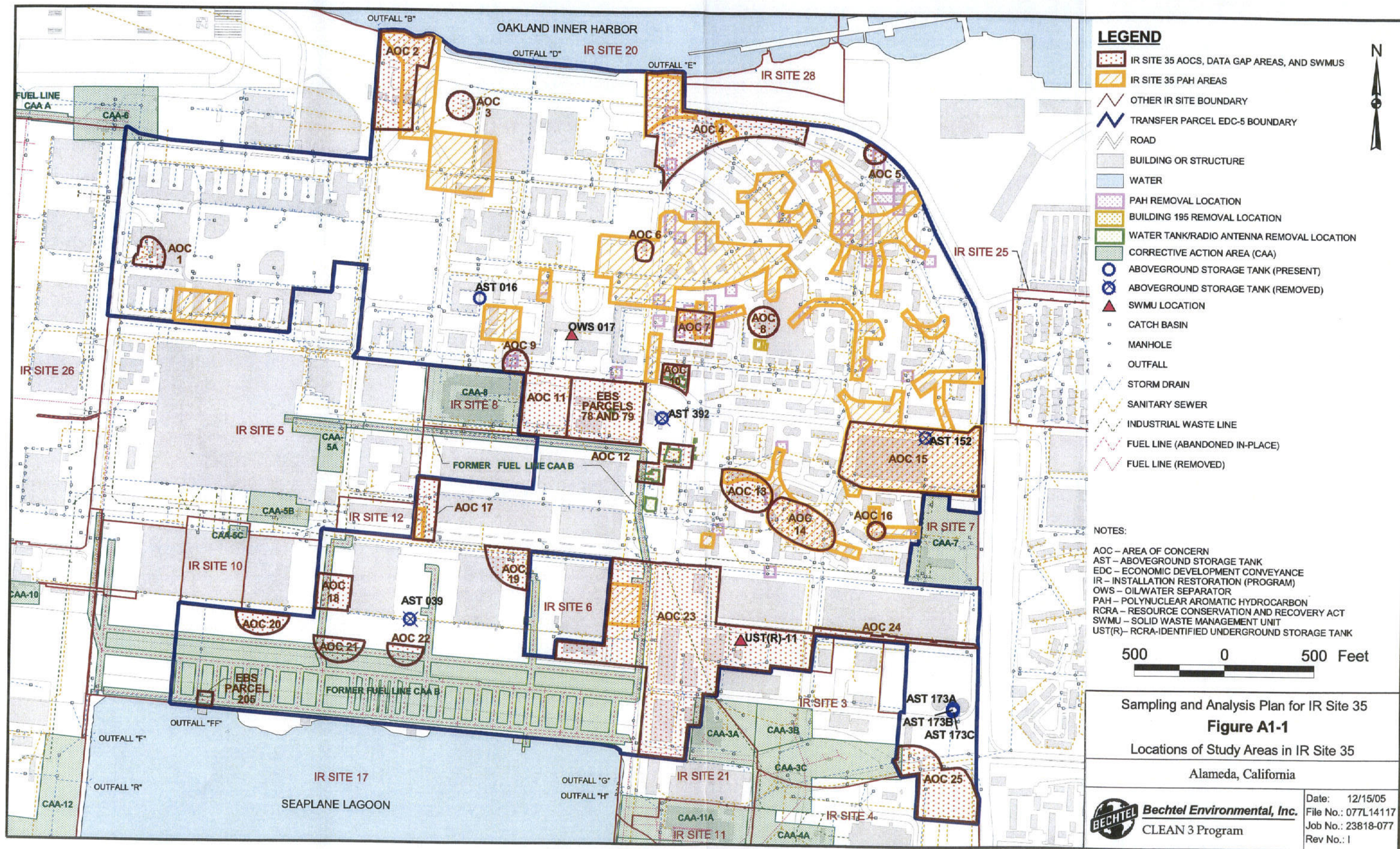
<http://www.epa.gov/region09/waste/sfund/prg/index.htm>. October.

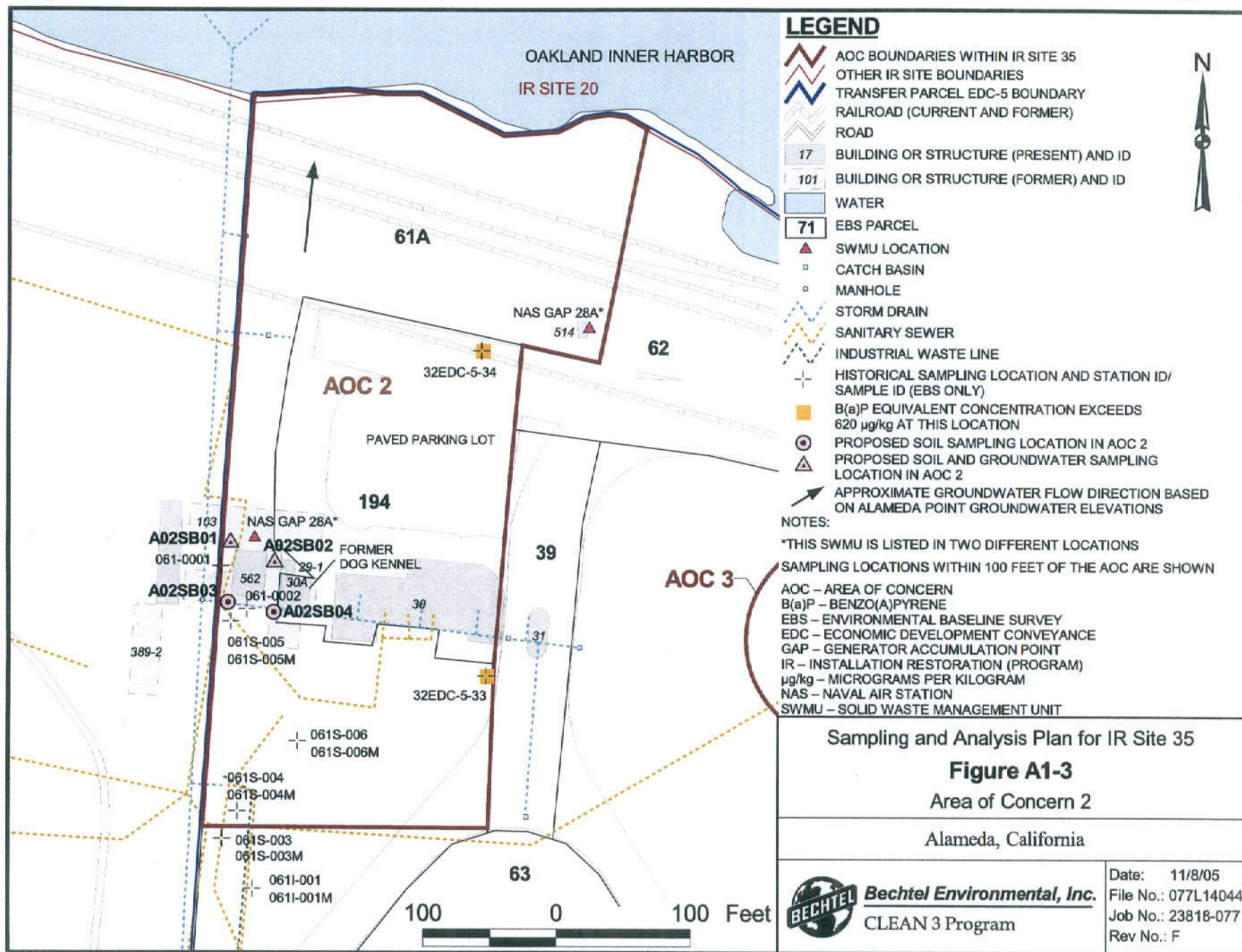
U.S. EPA. *See* United States Environmental Protection Agency.

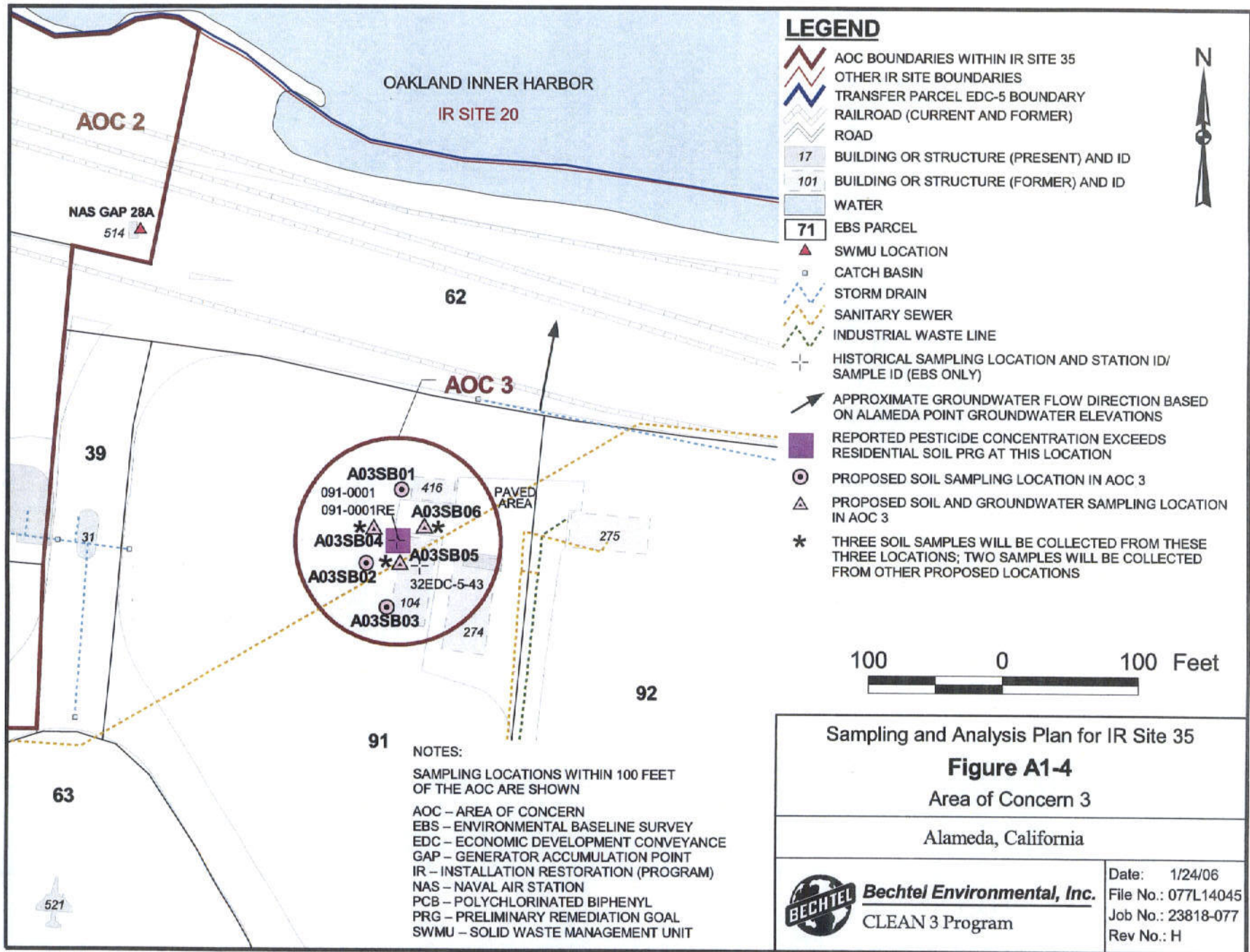
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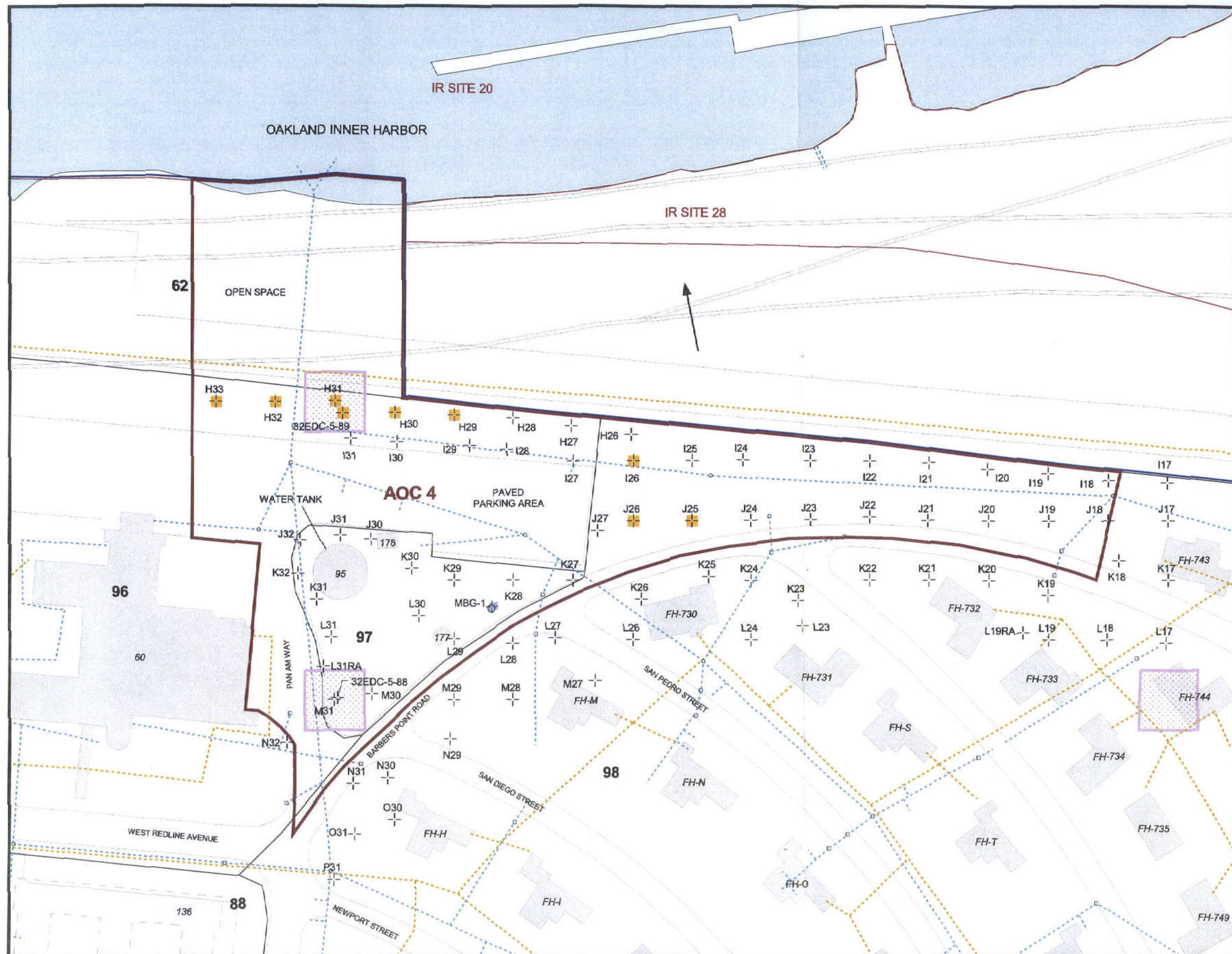
FINAL WORK PLAN FOR REMEDIAL INVESTIGATION IR SITE 35 AREAS OF CONCERN IN TRANSFER PARCEL EDC-5

DATED 13 MARCH 2006









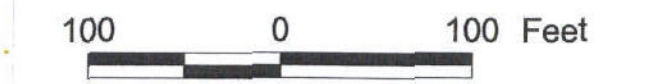
LEGEND

- AOC BOUNDARIES WITHIN IR SITE 35
- OTHER IR SITE BOUNDARIES
- TRANSFER PARCEL EDC-5 BOUNDARY
- RAILROAD (CURRENT AND FORMER)
- ROAD
- 17 BUILDING OR STRUCTURE (PRESENT) AND ID
- 101 BUILDING OR STRUCTURE (FORMER) AND ID
- WATER
- 71 EBS PARCEL
- PAH REMOVAL LOCATION
- CATCH BASIN
- MANHOLE
- STORM DRAIN
- SANITARY SEWER
- HISTORICAL SAMPLING LOCATION AND STATION ID/ SAMPLE ID (EBS ONLY)
- REPORTED METAL CONCENTRATION EXCEEDS PRIMARY MCL AT THIS LOCATION
- REPORTED METAL CONCENTRATION EXCEEDS RESIDENTIAL SOIL PRG AND IS ABOVE BACKGROUND AT THIS LOCATION
- B(a)P EQUIVALENT CONCENTRATION EXCEEDS 620 µg/kg AT THIS LOCATION
- APPROXIMATE GROUNDWATER FLOW DIRECTION BASED ON ALAMEDA POINT GROUNDWATER ELEVATIONS

NOTES:

SAMPLING LOCATIONS WITHIN 100 FEET OF THE AOC ARE SHOWN

AOC - AREA OF CONCERN
 B(a)P - BENZO(A)PYRENE
 EBS - ENVIRONMENTAL BASELINE SURVEY
 EDC - ECONOMIC DEVELOPMENT CONVEYANCE
 IR - INSTALLATION RESTORATION (PROGRAM)
 MCL - MAXIMUM CONTAMINANT LEVEL
 µg/kg - MICROGRAMS PER KILOGRAM
 PAH - POLYNUCLEAR AROMATIC HYDROCARBON
 PRG - PRELIMINARY REMEDIATION GOAL



Sampling and Analysis Plan for IR Site 35

Figure A1-5

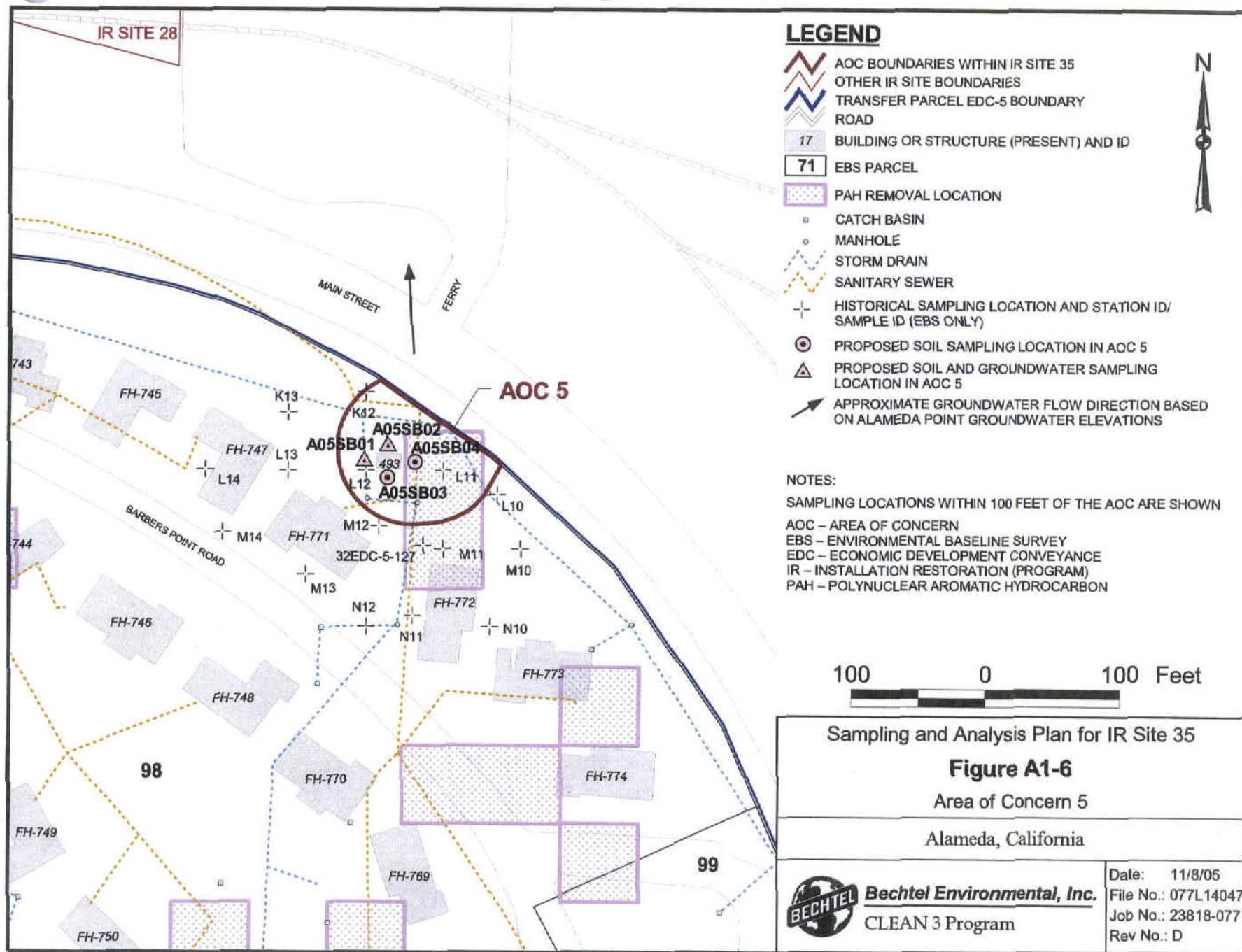
Area of Concern 4

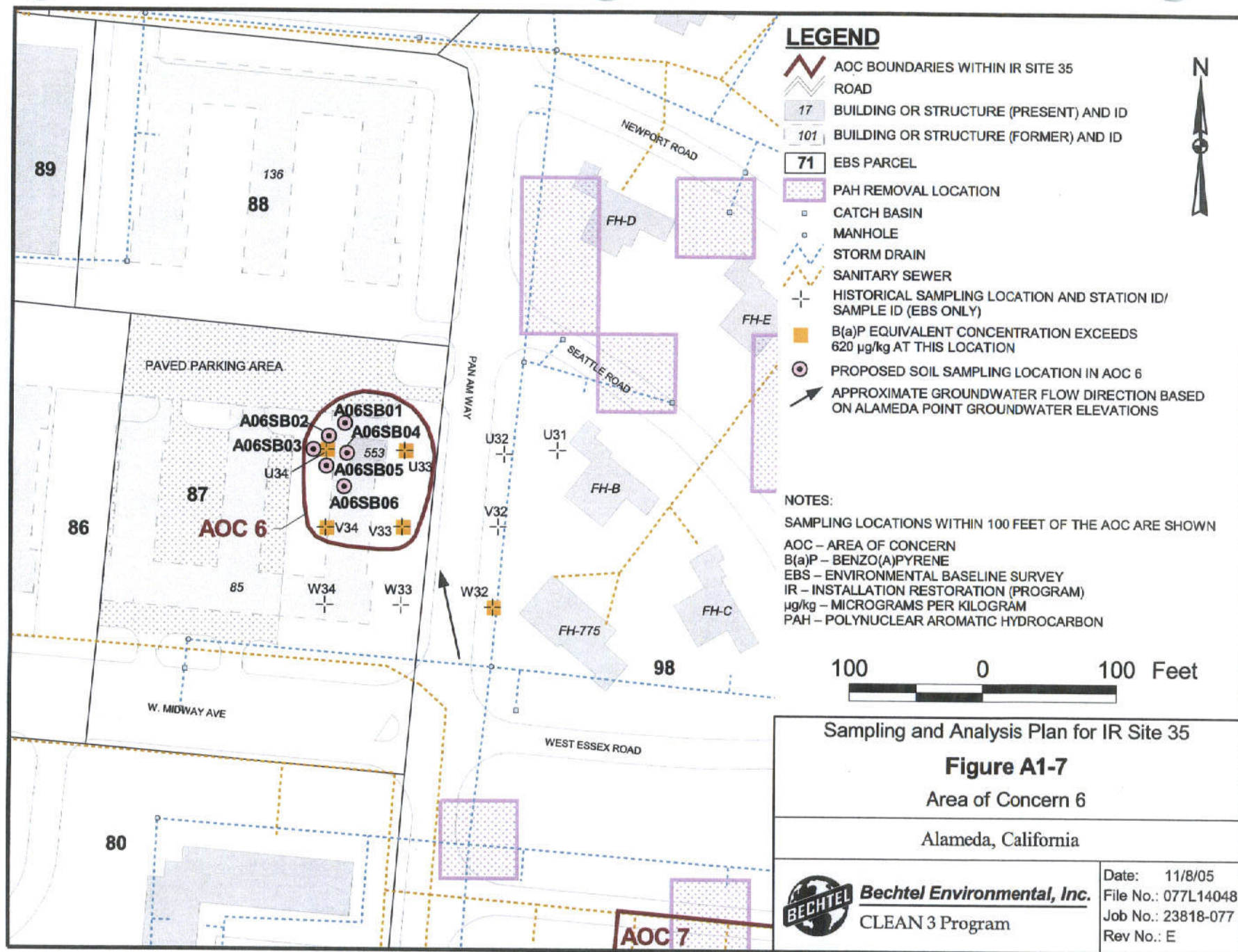
Alameda, California

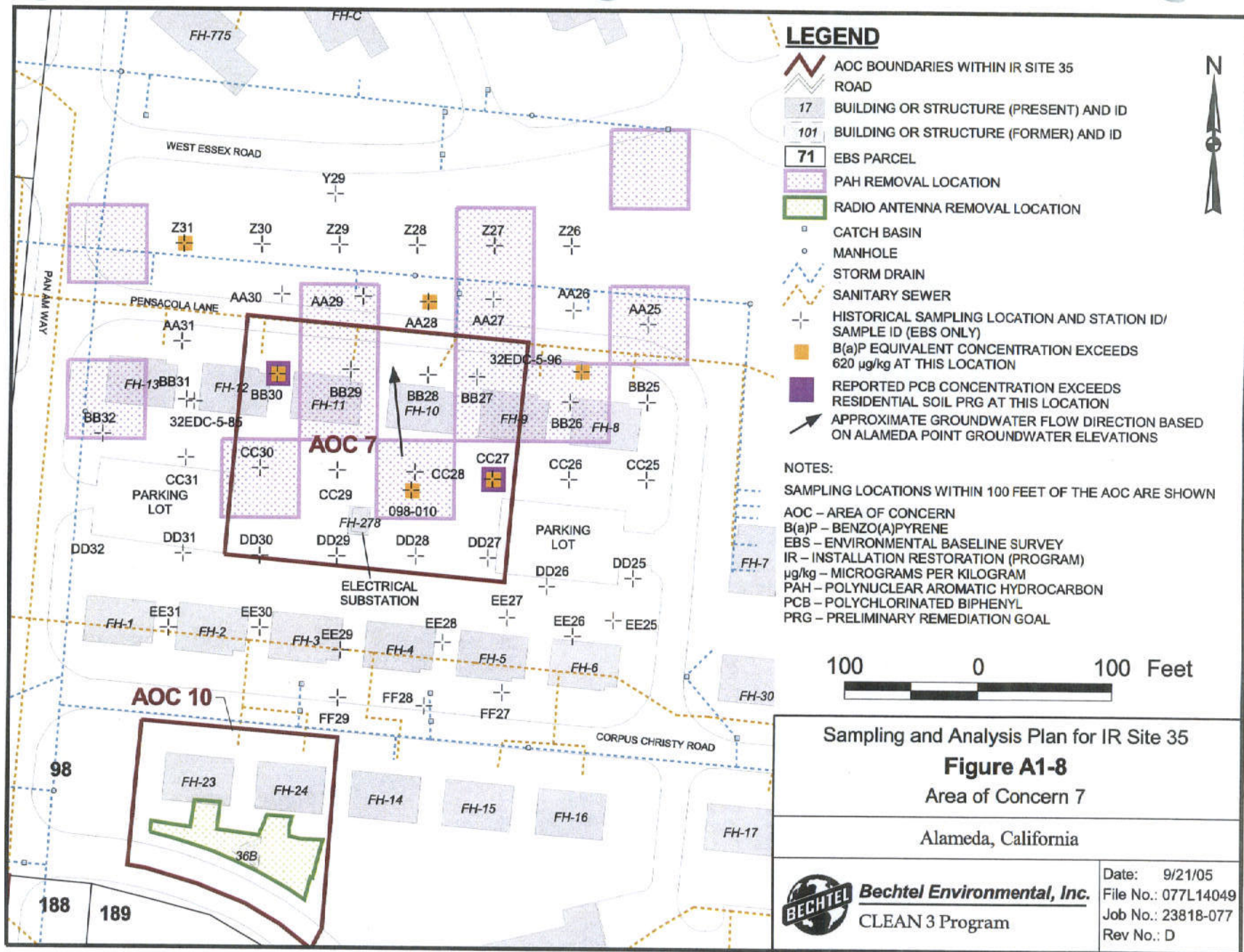
Bechtel Environmental, Inc.

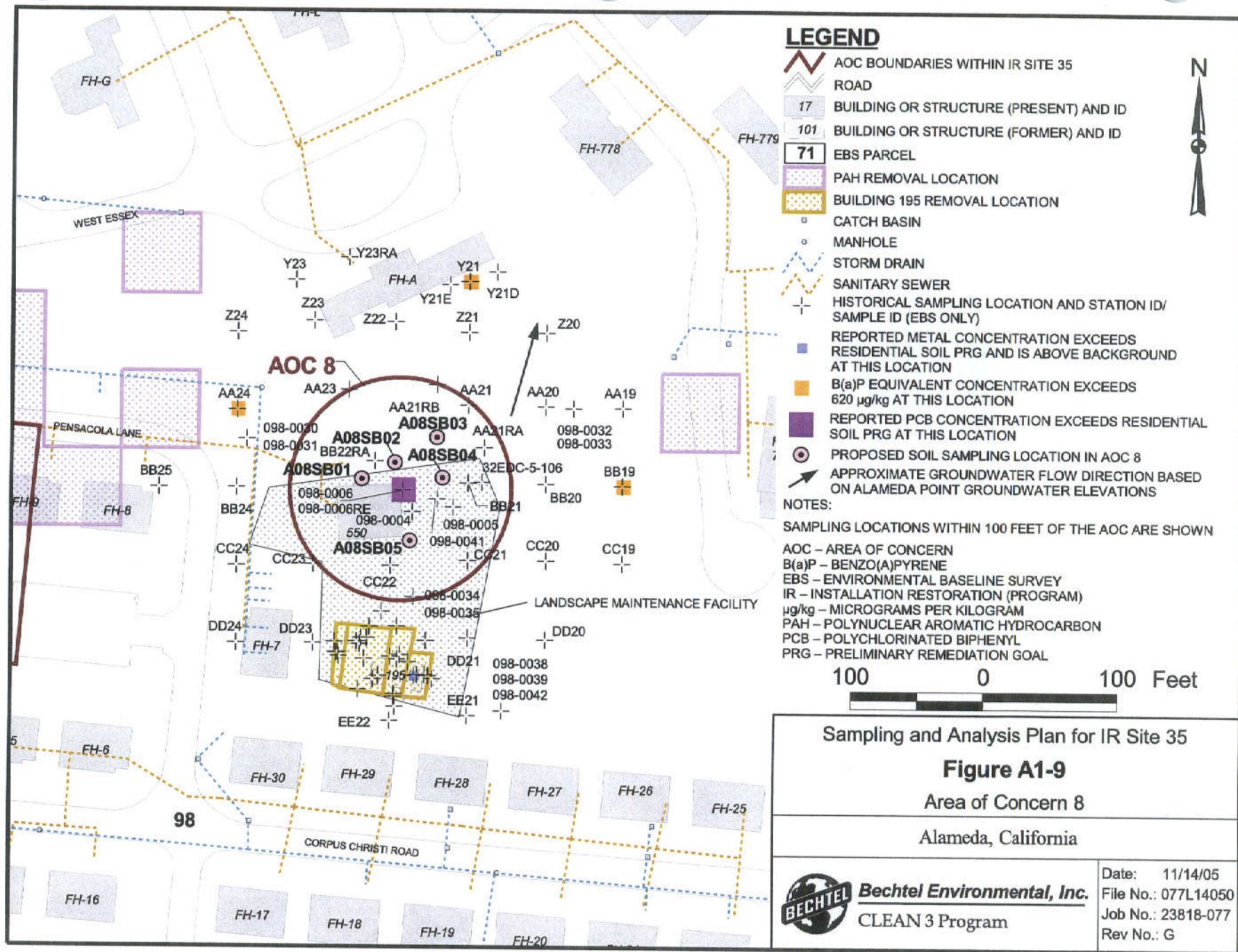
CLEAN 3 Program

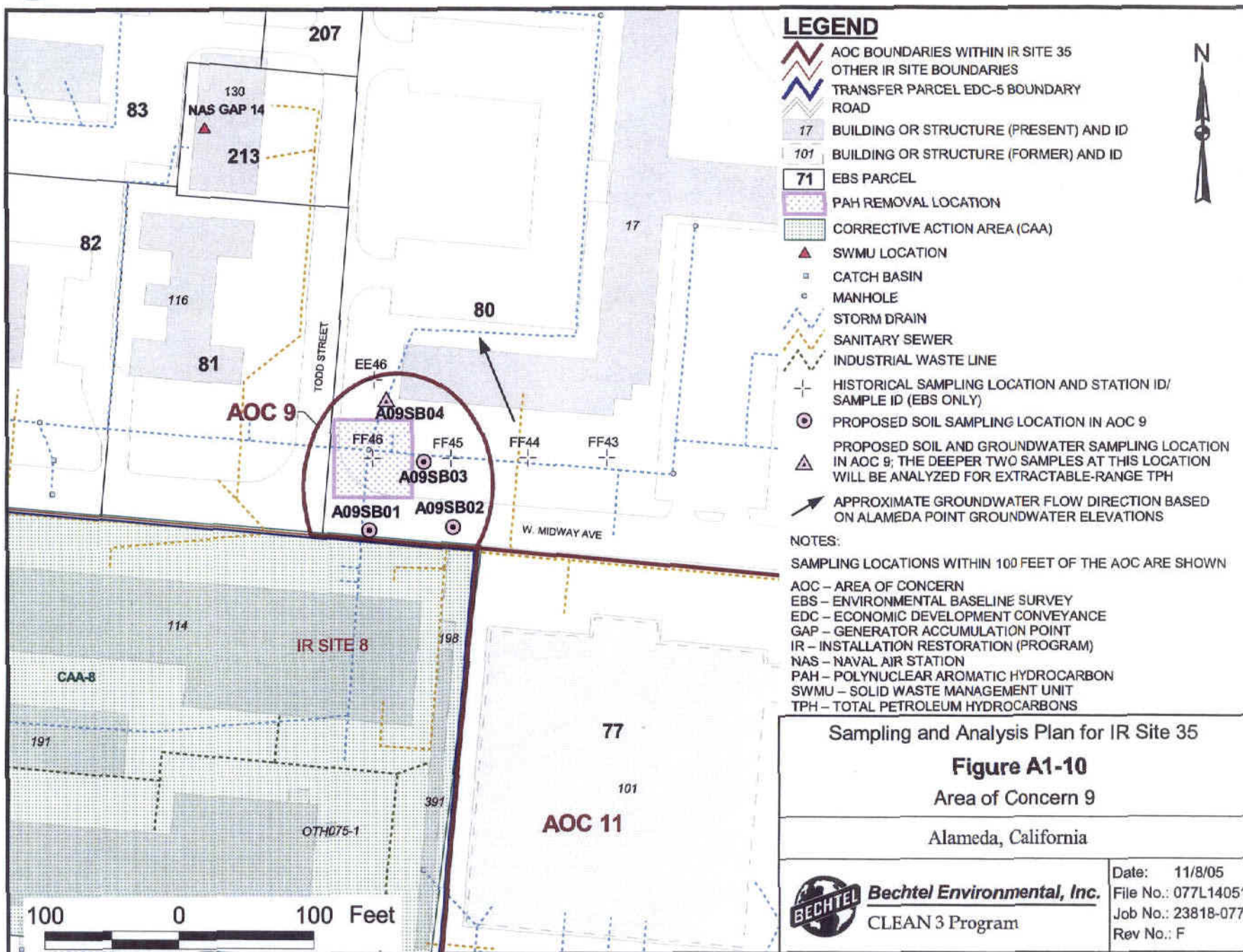
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 Job No.: 23818-077
 Rev No.: F

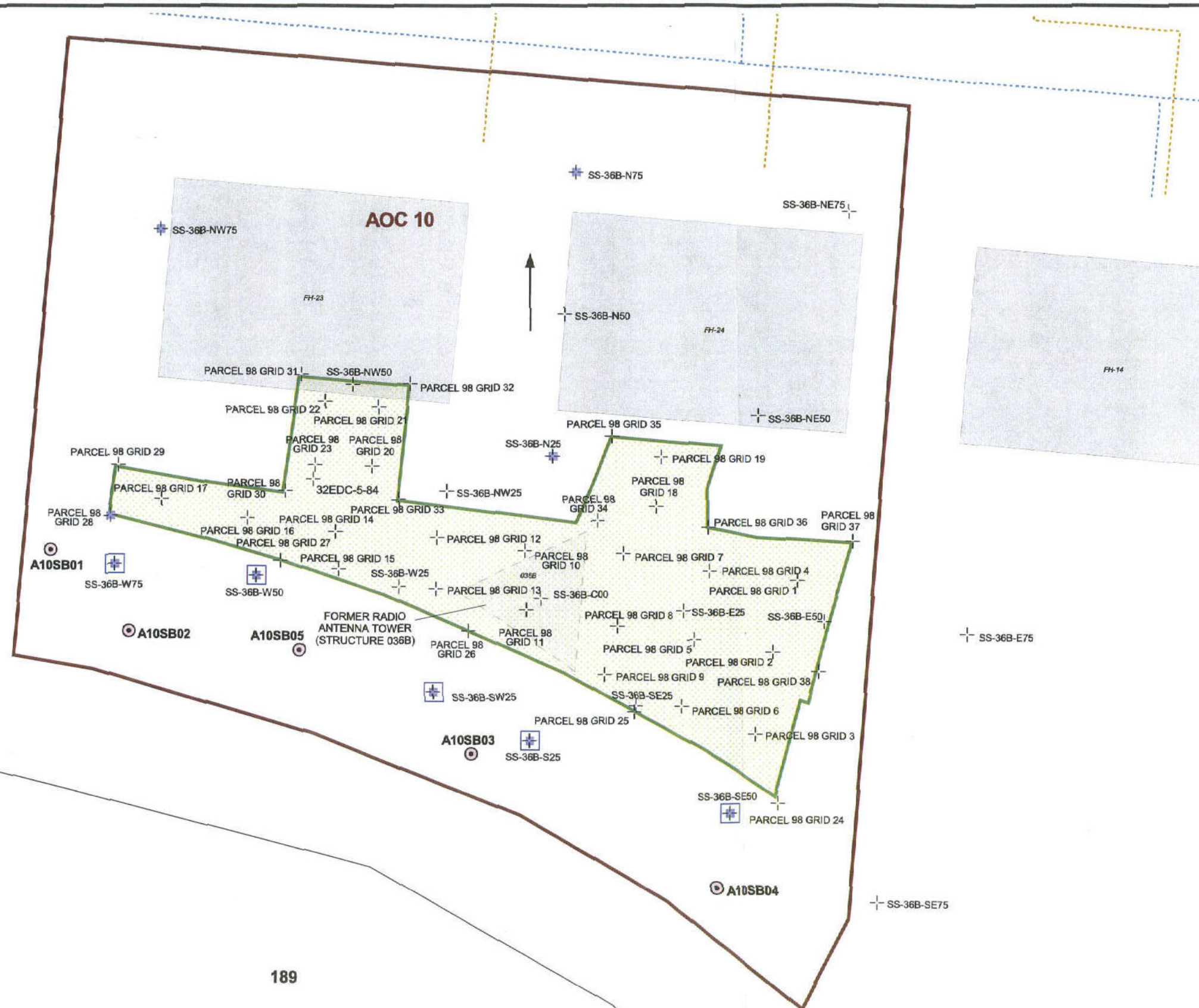












LEGEND

- AOC BOUNDARIES WITHIN IR SITE 35
- RAILROAD (CURRENT AND FORMER)
- ROAD
- BUILDING OR STRUCTURE (PRESENT) AND ID
- BUILDING OR STRUCTURE (FORMER) AND ID
- EBS PARCEL
- RADIO ANTENNA REMOVAL LOCATION
- STORM DRAIN
- SANITARY SEWER
- HISTORICAL SAMPLING LOCATION AND STATION ID/ SAMPLE ID (EBS ONLY)
- REPORTED LEAD CONCENTRATION EXCEEDS RESIDENTIAL SOIL PRG AND IS ABOVE BACKGROUND AT THIS LOCATION
- REPORTED LEAD CONCENTRATION EXCEEDS REMEDIAL ACTION OBJECTIVE AT THIS LOCATION
- PROPOSED SOIL SAMPLING LOCATION IN AOC 10
- APPROXIMATE GROUNDWATER FLOW DIRECTION BASED ON ALAMEDA POINT GROUNDWATER ELEVATIONS

NOTES:
AOC – AREA OF CONCERN
EBS – ENVIRONMENTAL BASELINE SURVEY
IR – INSTALLATION RESTORATION (PROGRAM)
PRG – PRELIMINARY REMEDIATION GOAL

20 0 20 Feet

Sampling and Analysis Plan for IR Site 35

Figure A1-11

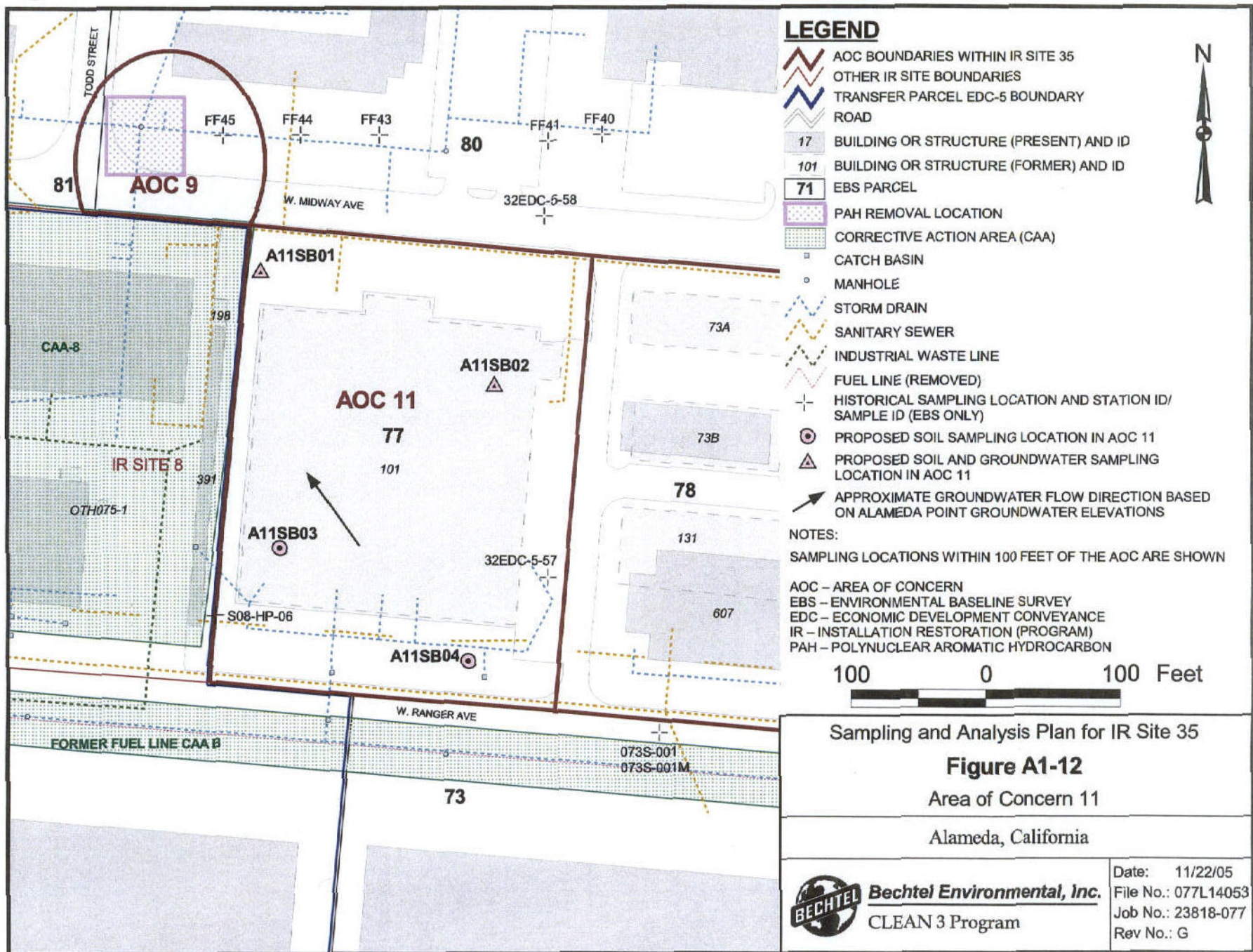
Area of Concern 10

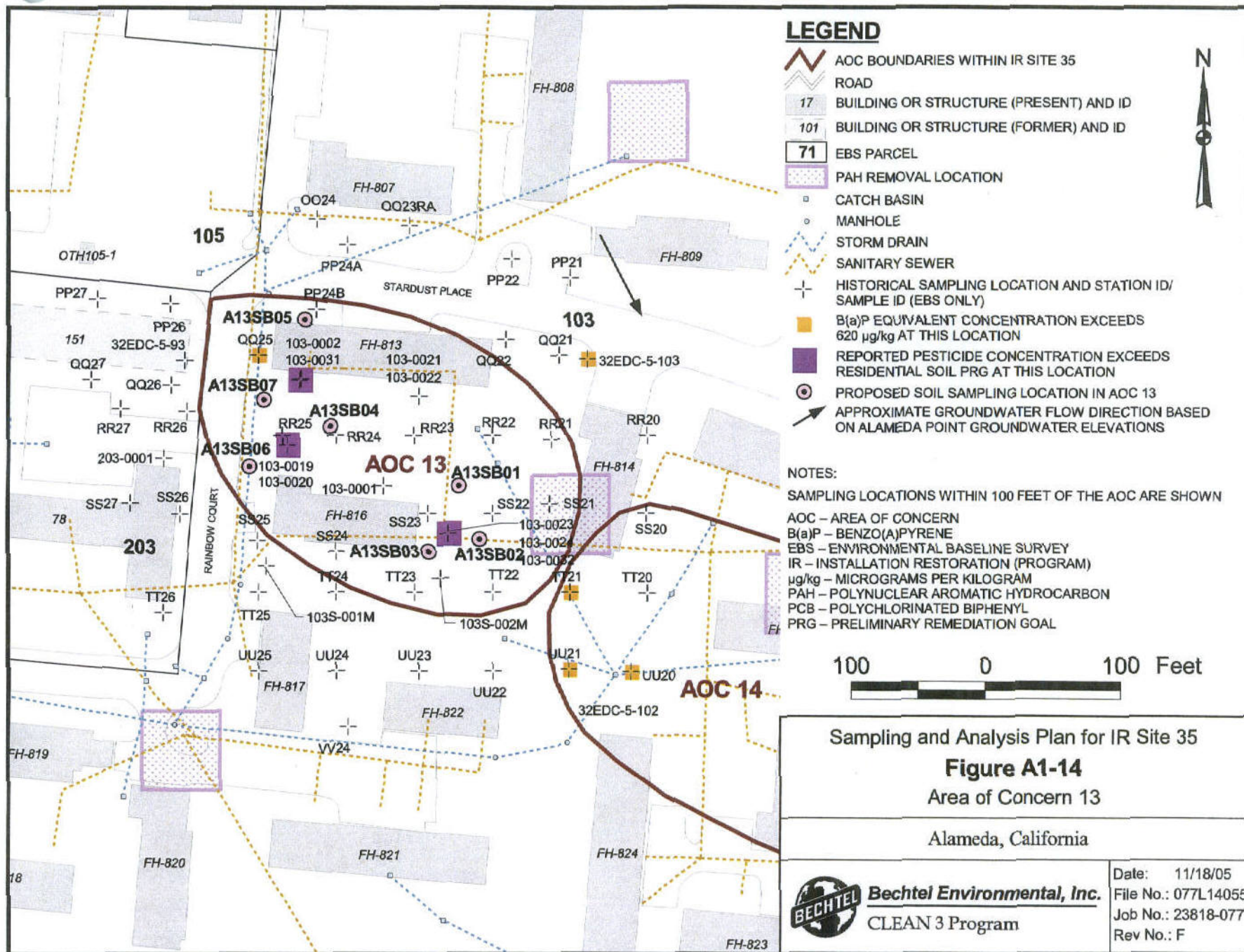
Alameda, California

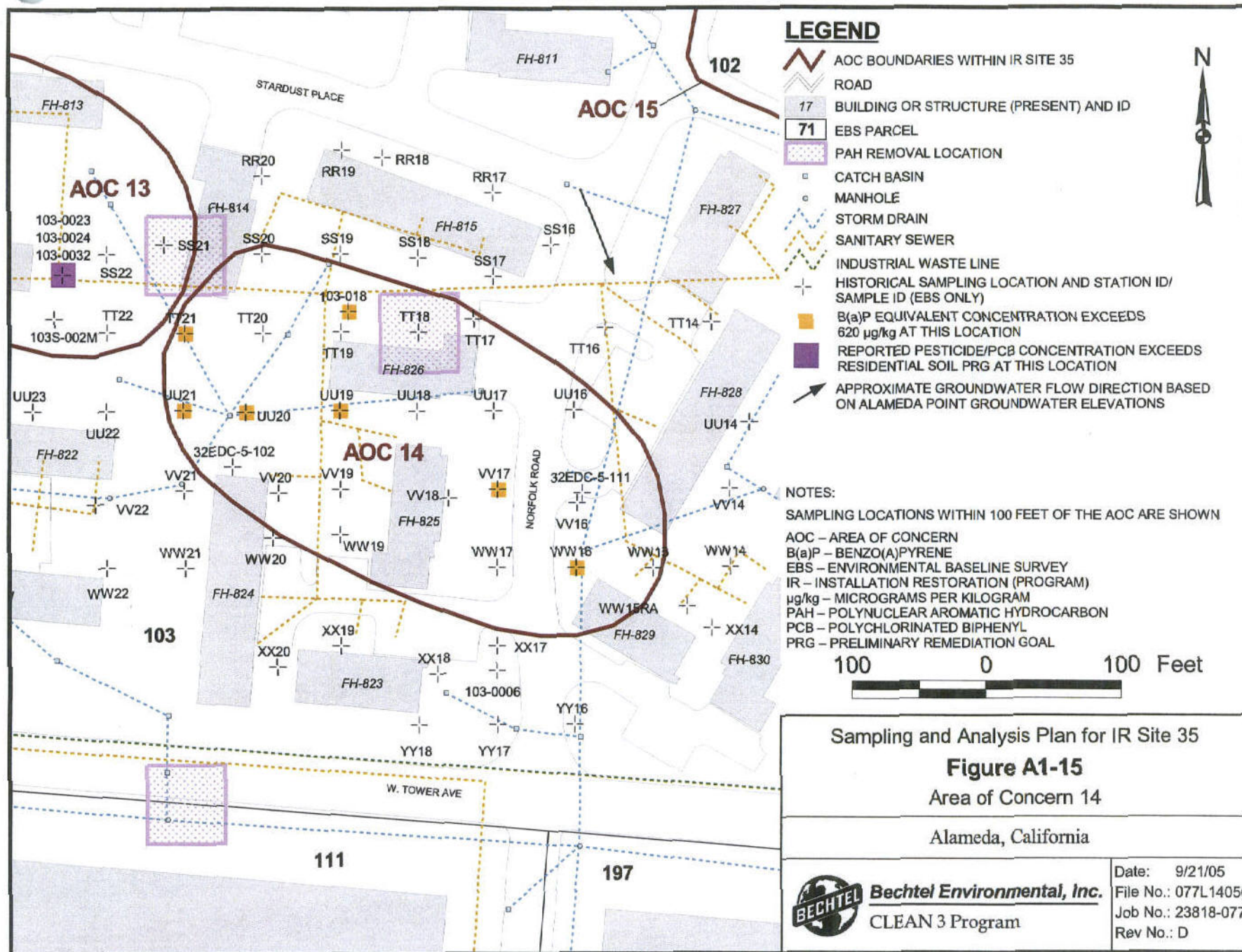


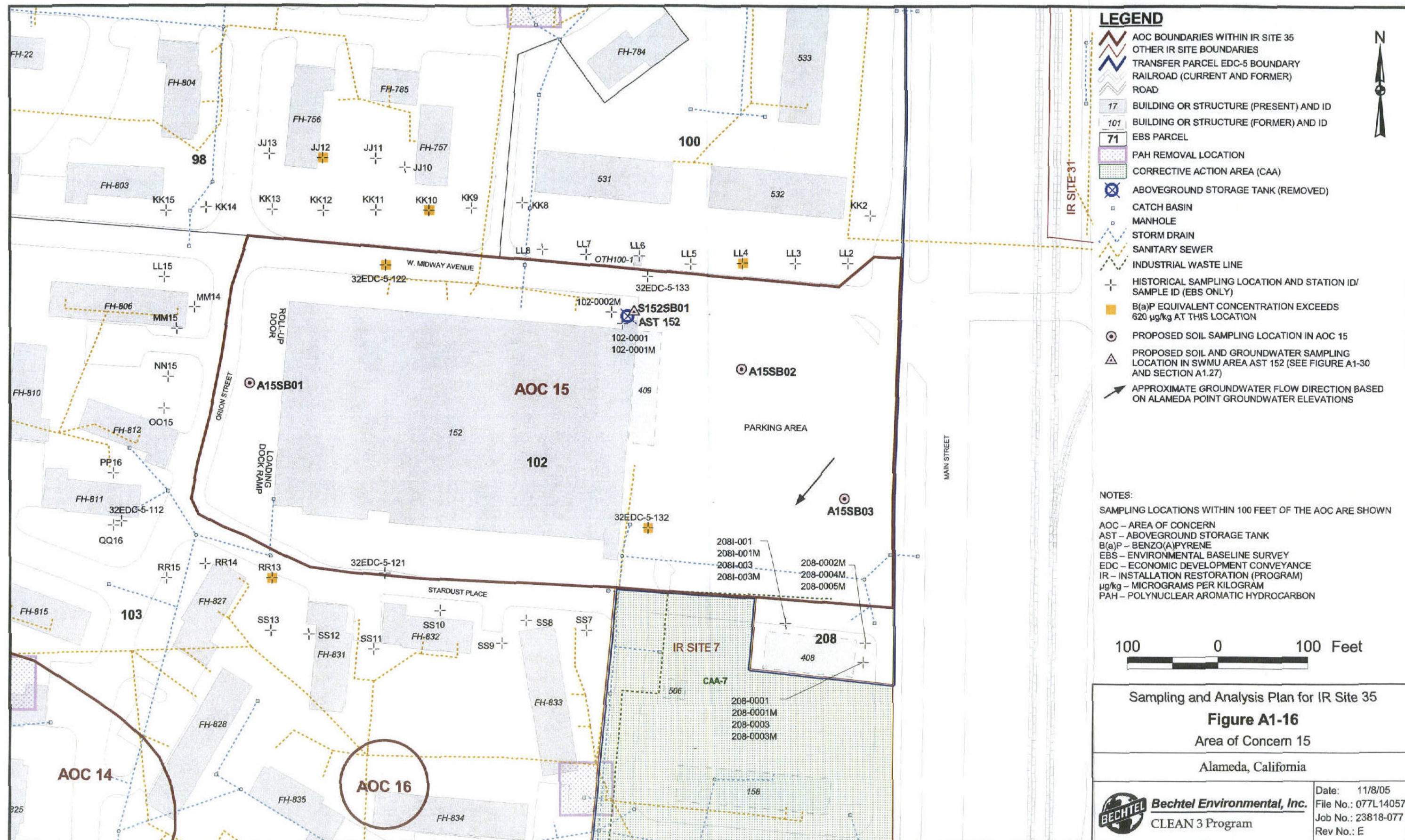
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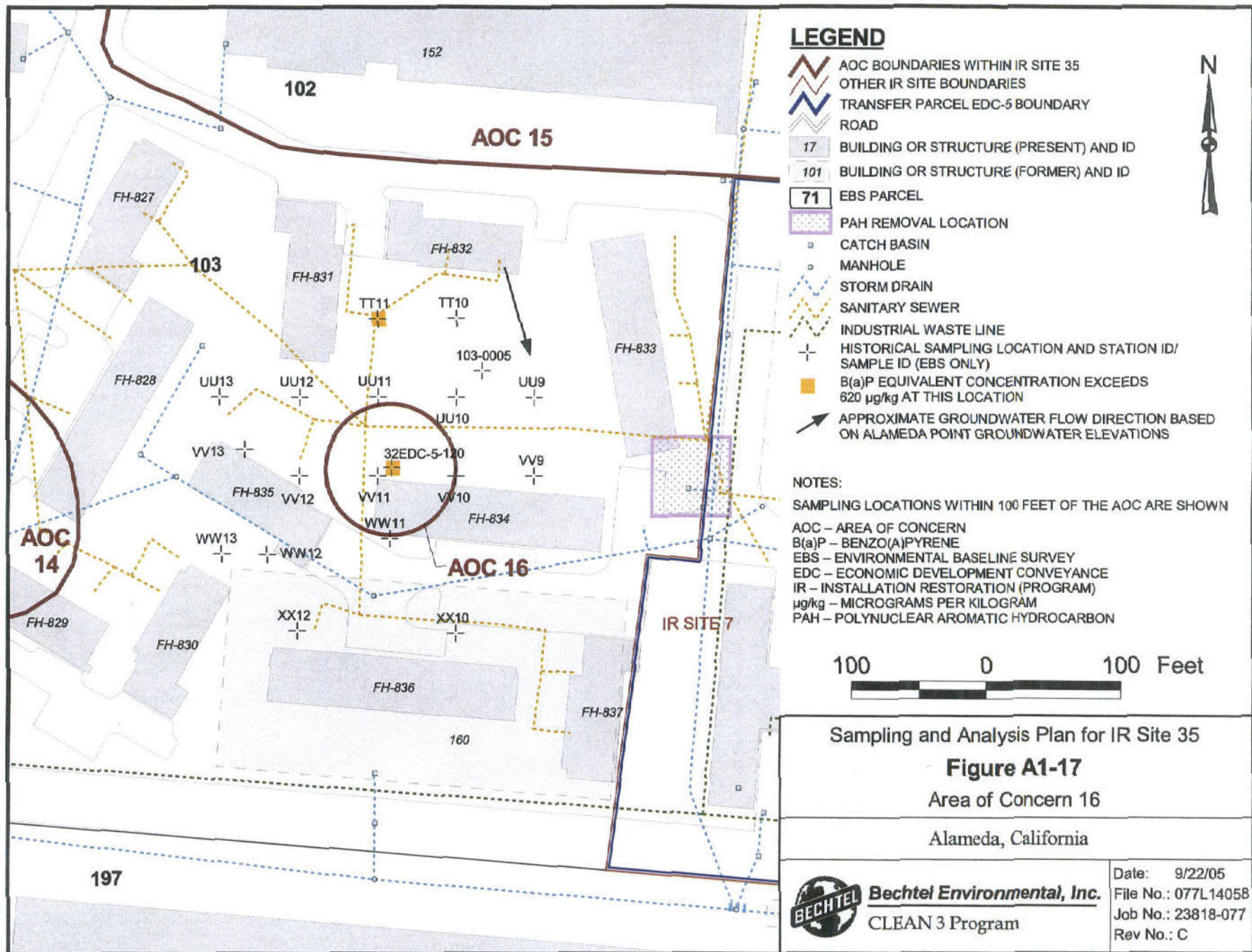
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Job No.: 23818-077
Rev No.: E

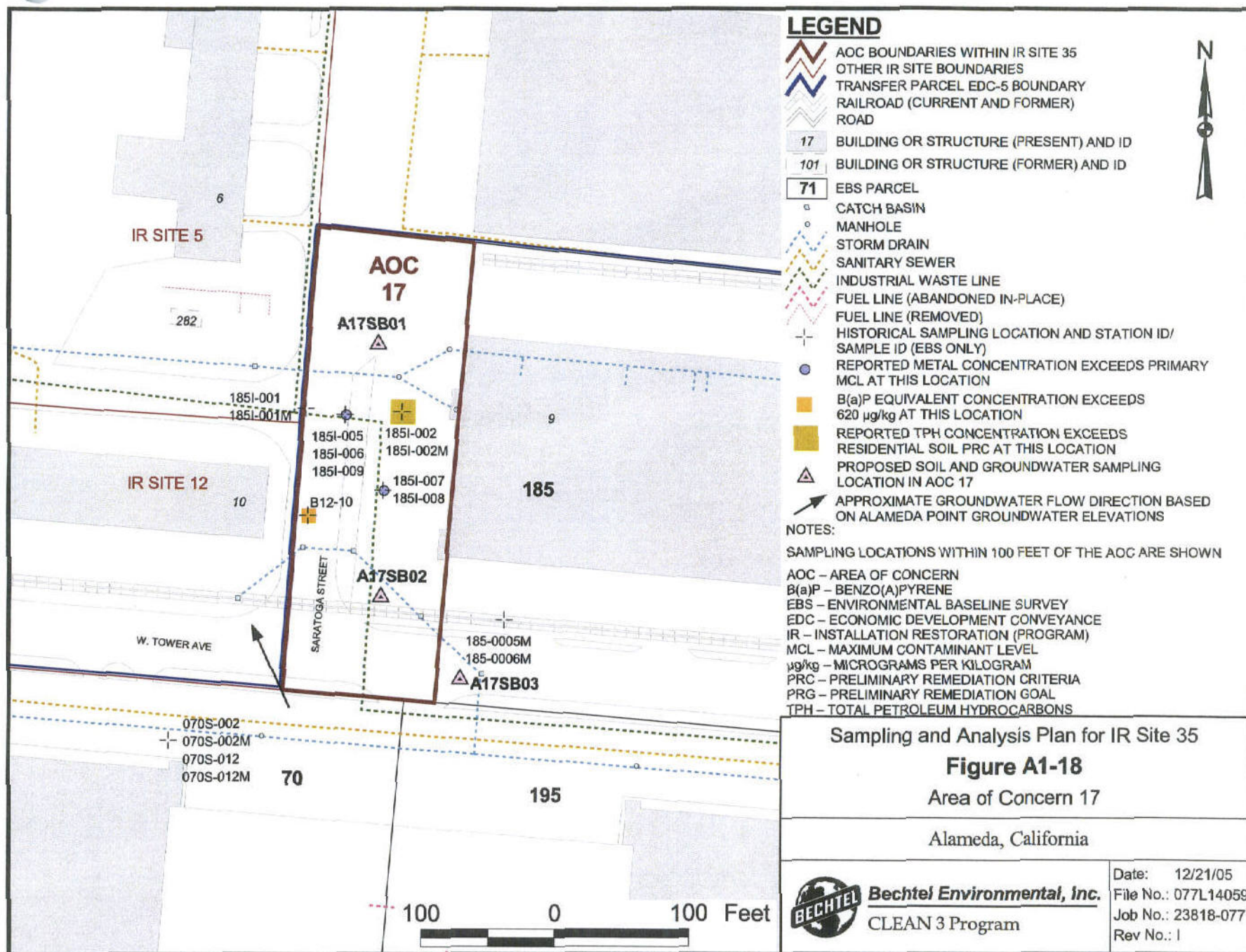


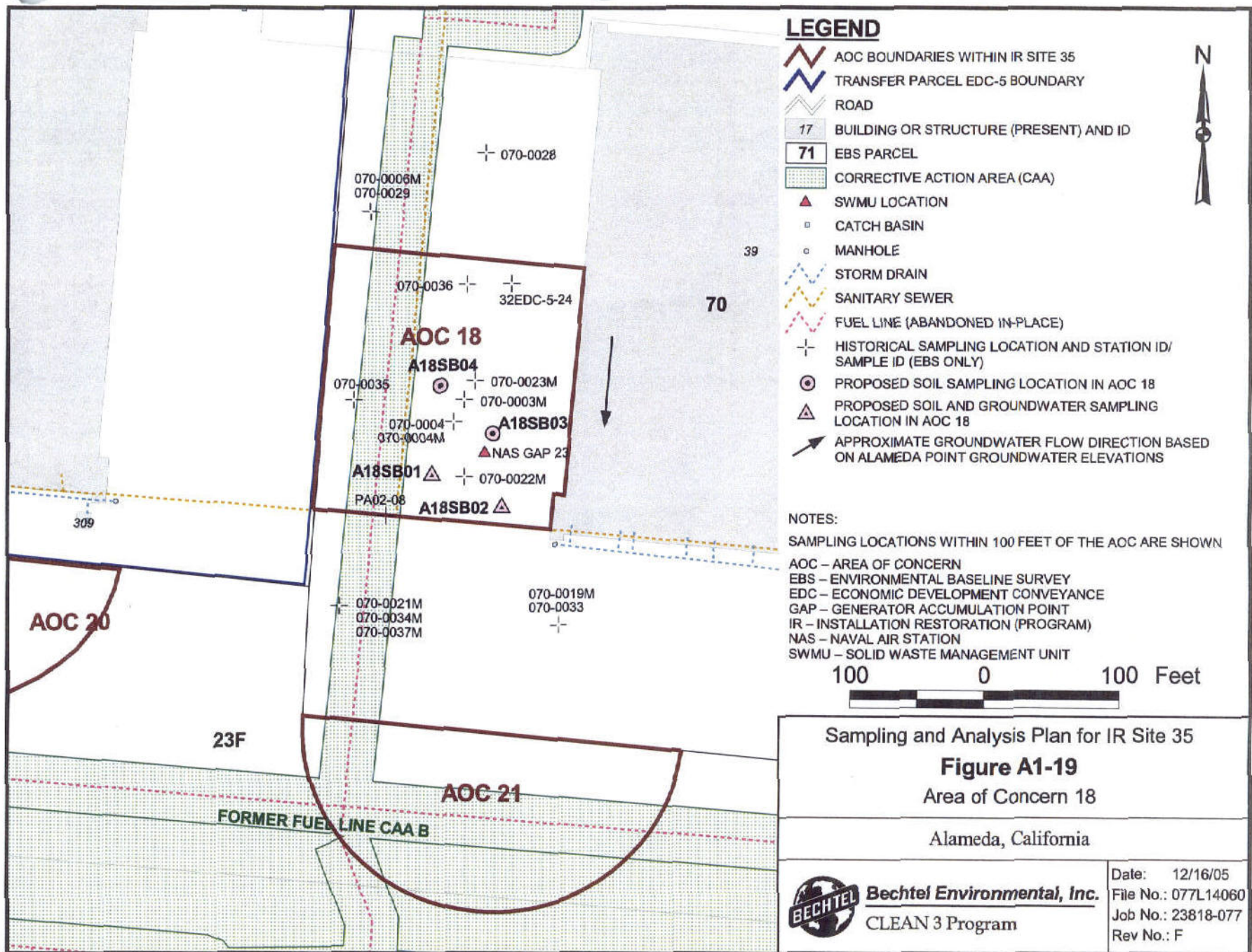


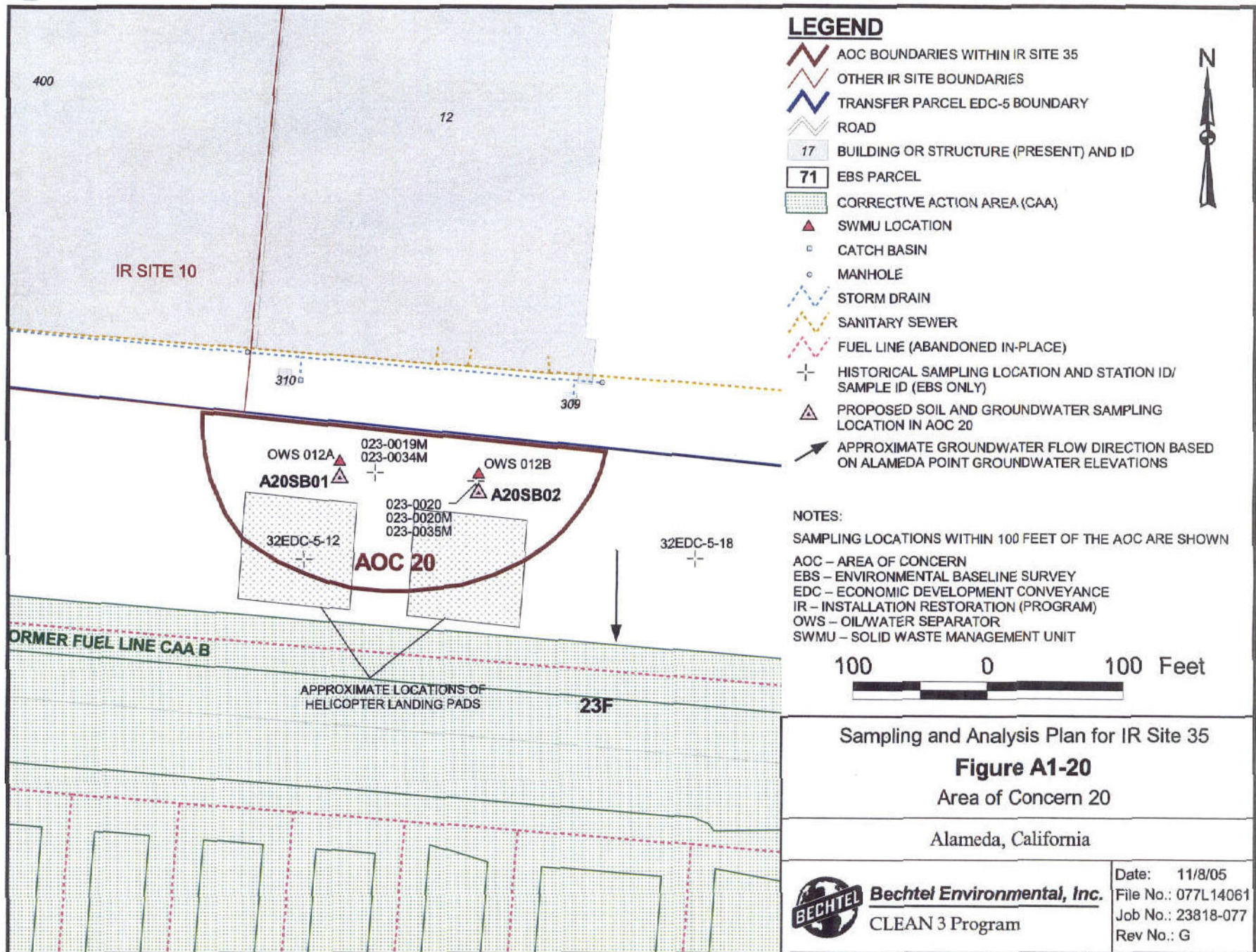


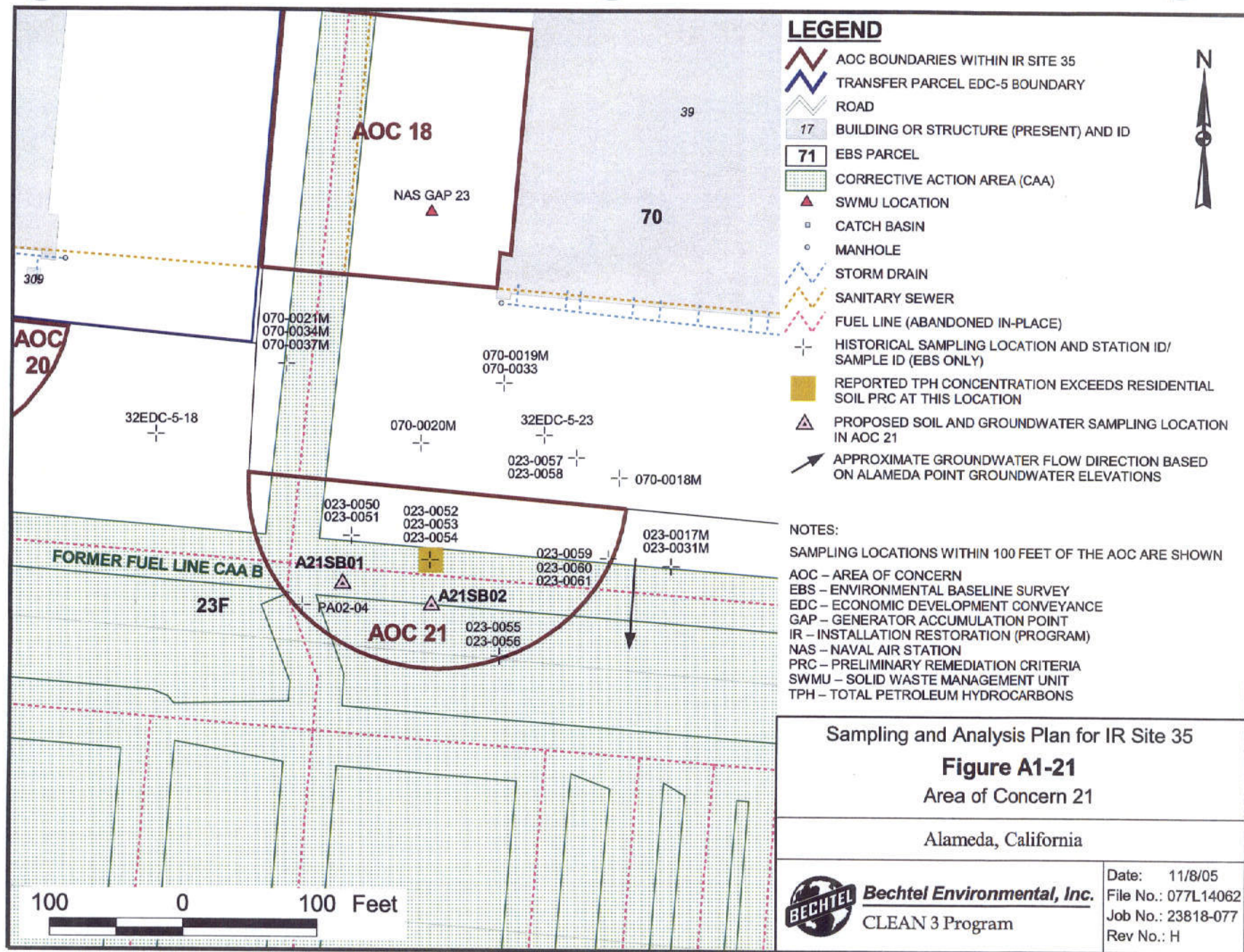












Sampling and Analysis Plan for IR Site 35

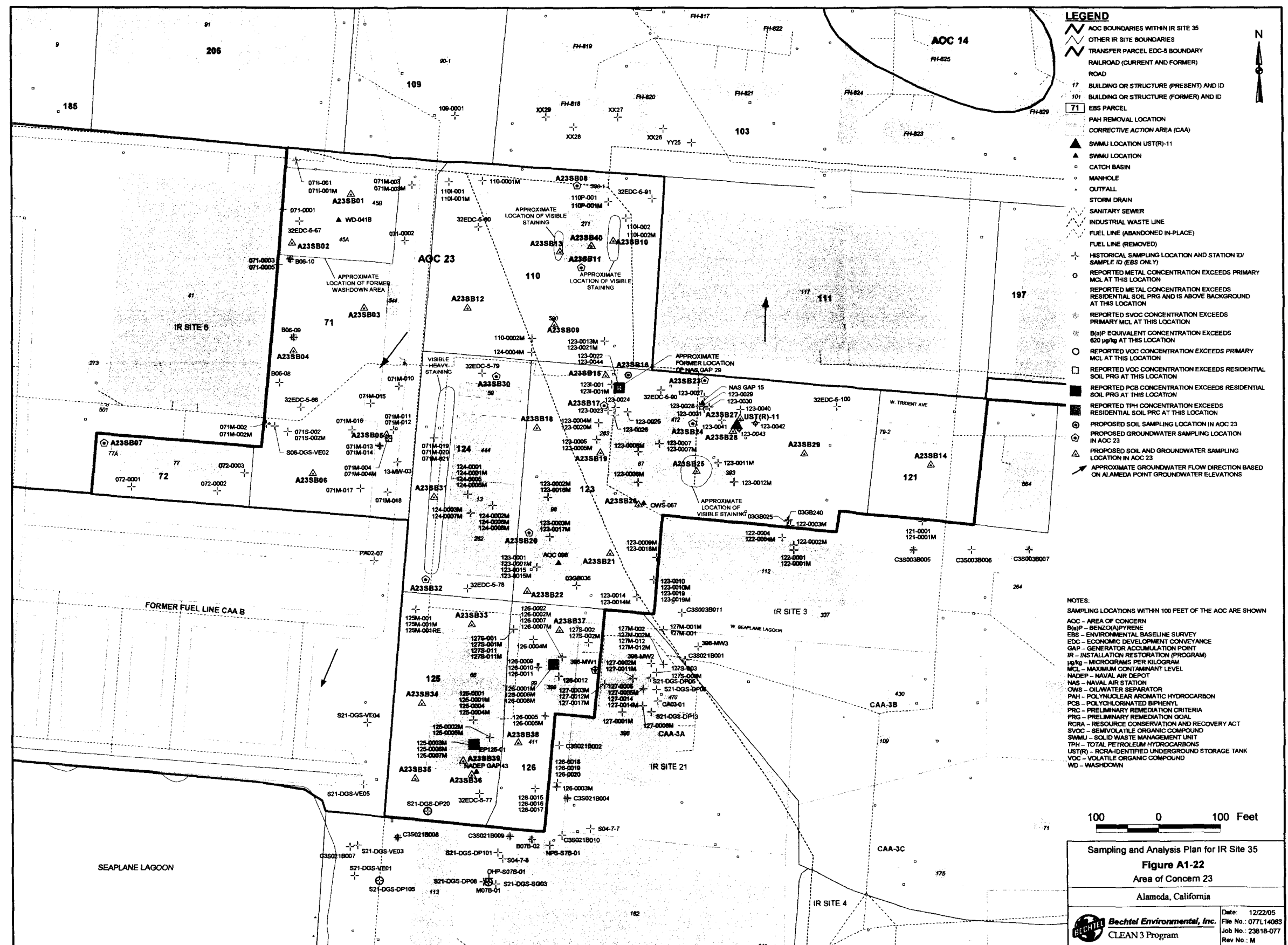
Figure A1-21 Area of Concern 21

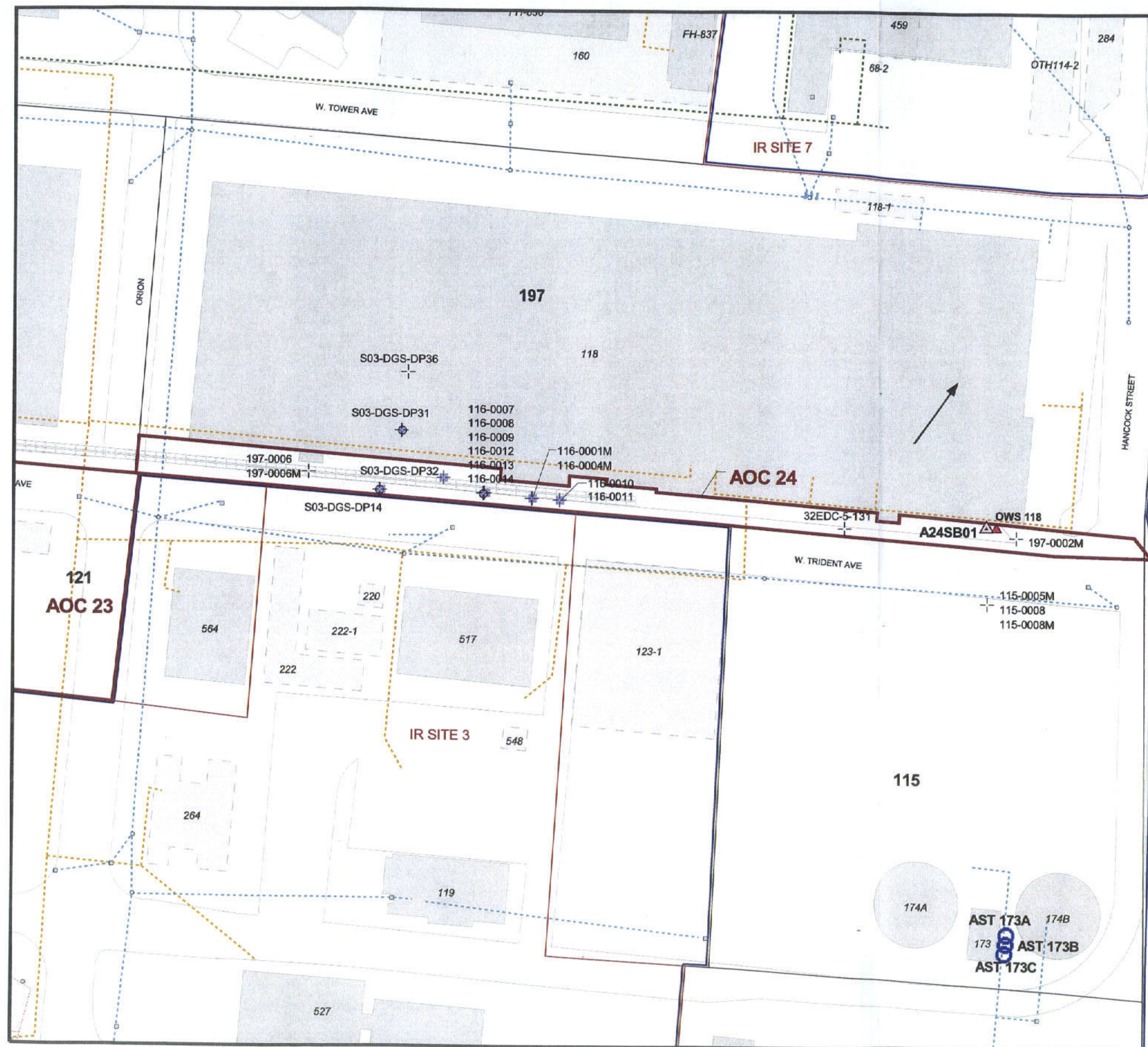
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LEGEND

- AOC BOUNDARIES WITHIN IR SITE 35
- OTHER IR SITE BOUNDARIES
- TRANSFER PARCEL EDC-5 BOUNDARY
- RAILROAD (CURRENT AND FORMER)
- ROAD
- 17 BUILDING OR STRUCTURE (PRESENT) AND ID
- 101 BUILDING OR STRUCTURE (FORMER) AND ID
- 71 EBS PARCEL
- ABOVEGROUND STORAGE TANK (PRESENT)
- SWMU LOCATION
- CATCH BASIN
- MANHOLE
- STORM DRAIN
- SANITARY SEWER
- INDUSTRIAL WASTE LINE
- HISTORICAL SAMPLING LOCATION AND STATION ID/ SAMPLE ID (EBS ONLY)
- REPORTED METAL CONCENTRATION EXCEEDS PRIMARY MCL* AT THIS LOCATION
- REPORTED METAL CONCENTRATION EXCEEDS RESIDENTIAL SOIL PRG AND IS ABOVE BACKGROUND AT THIS LOCATION
- PROPOSED SOIL AND GROUNDWATER SAMPLING LOCATION IN AOC 24
- APPROXIMATE GROUNDWATER FLOW DIRECTION BASED ON ALAMEDA POINT GROUNDWATER ELEVATIONS



NOTES:

*REGULATORY ACTION LEVEL FOR LEAD IN TAP WATER
SAMPLING LOCATIONS WITHIN 100 FEET OF THE AOC ARE SHOWN

AOC – AREA OF CONCERN
EBS – ENVIRONMENTAL BASELINE SURVEY
EDC – ECONOMIC DEVELOPMENT CONVEYANCE
IR – INSTALLATION RESTORATION (PROGRAM)
MCL – MAXIMUM CONTAMINANT LEVEL
OWS – OIL/WATER SEPARATOR
PRG – PRELIMINARY REMEDIATION GOAL
SWMU – SOLID WASTE MANAGEMENT UNIT

100 0 100 Feet

Sampling and Analysis Plan for IR Site 35

Figure A1-23

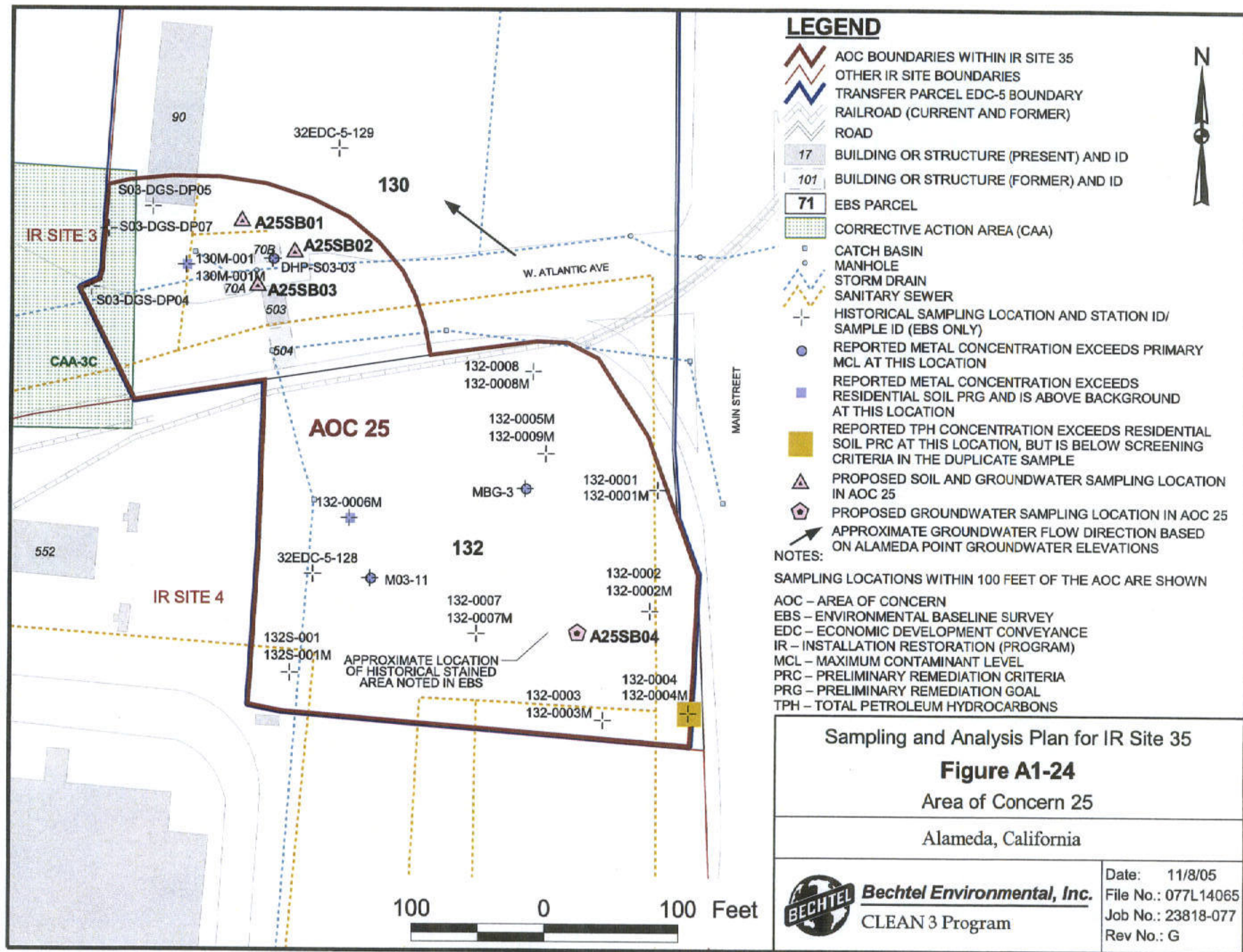
Area of Concern 24

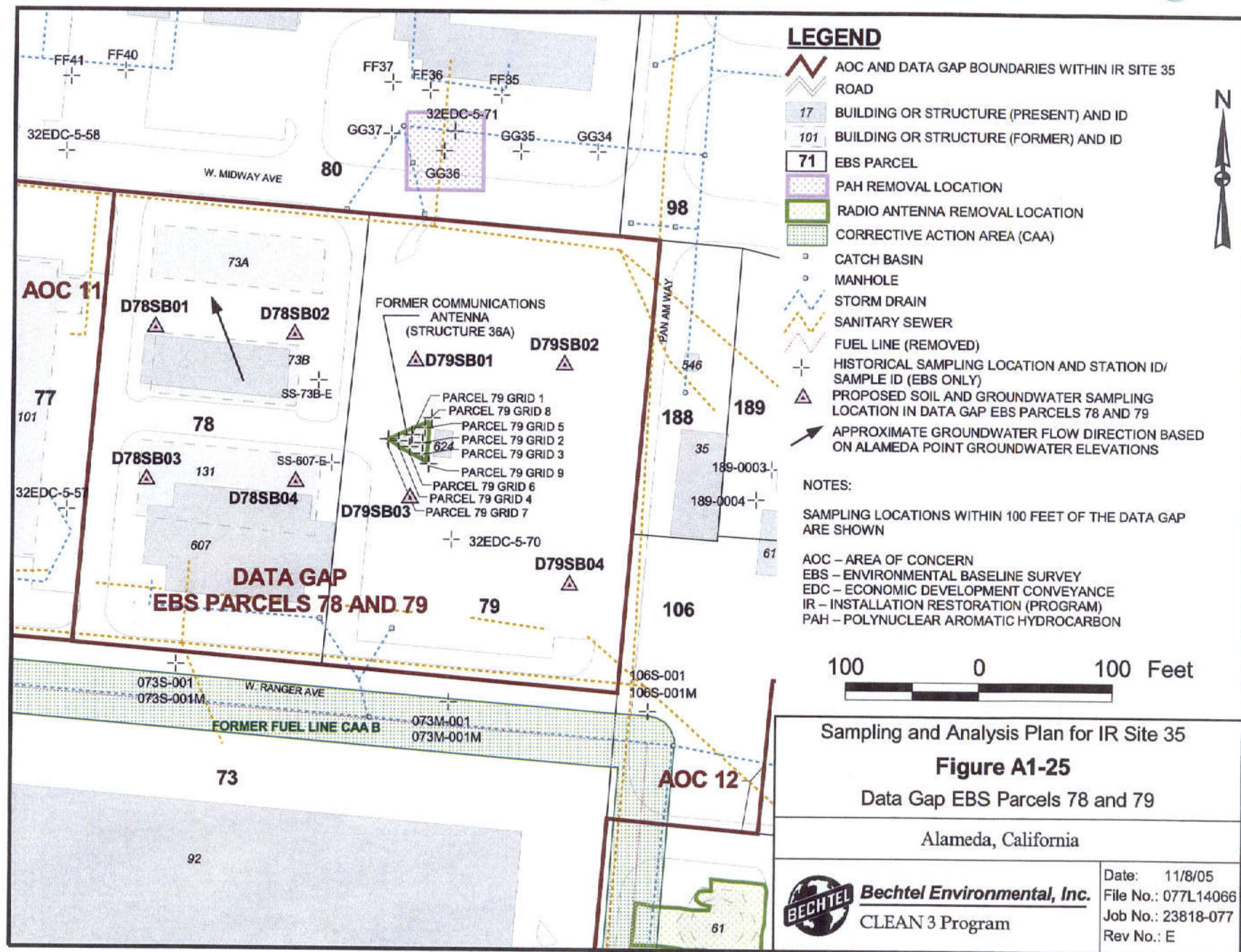
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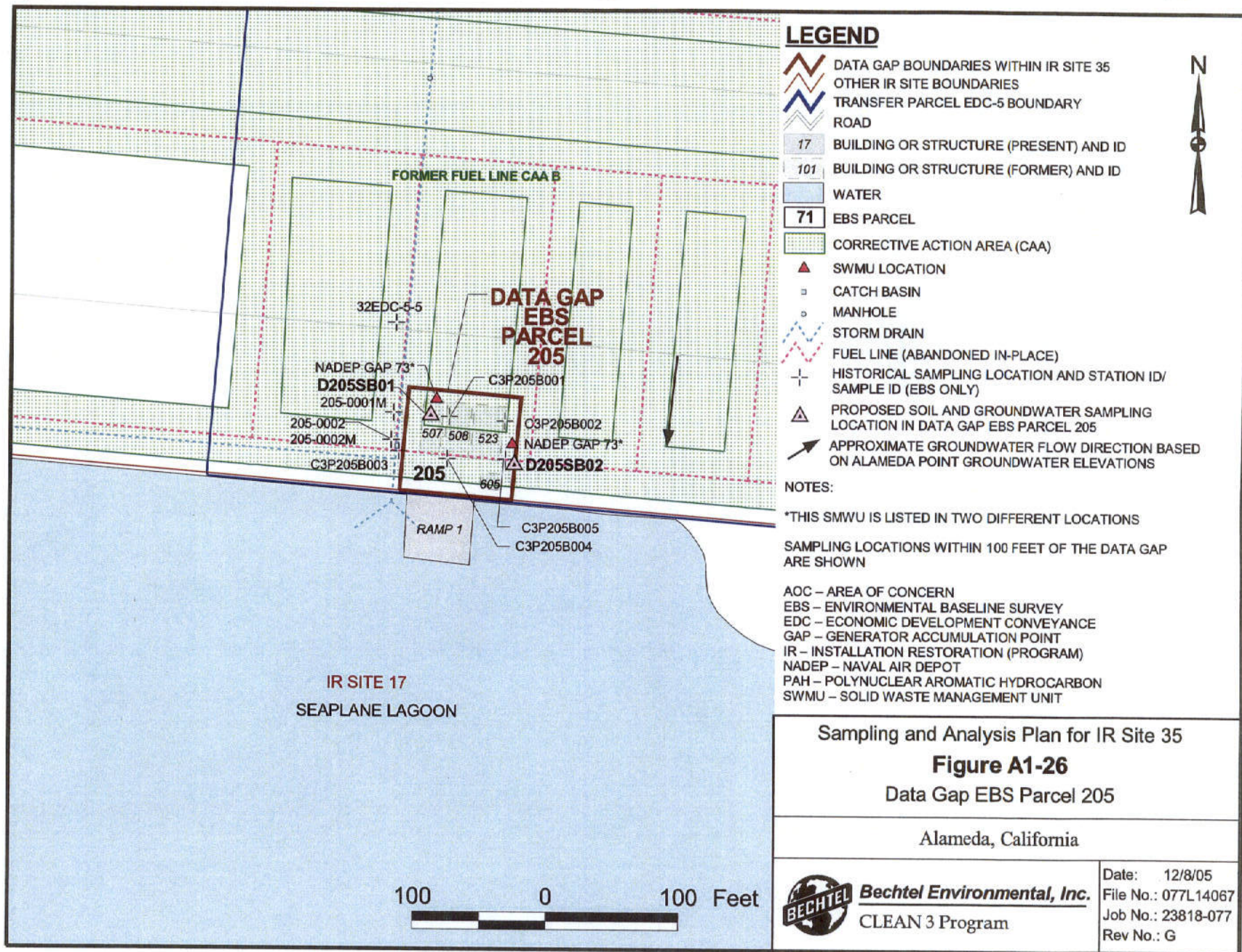


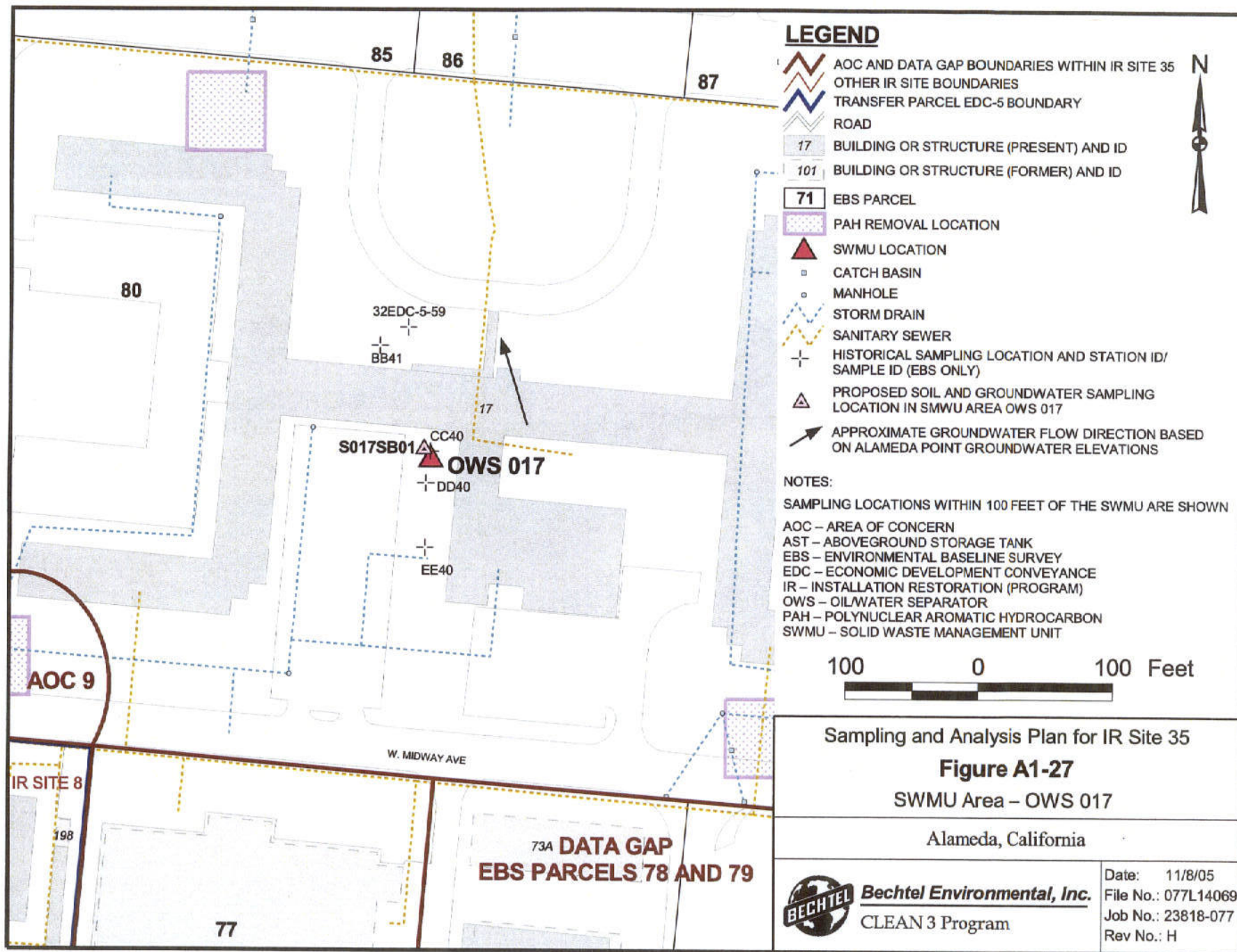
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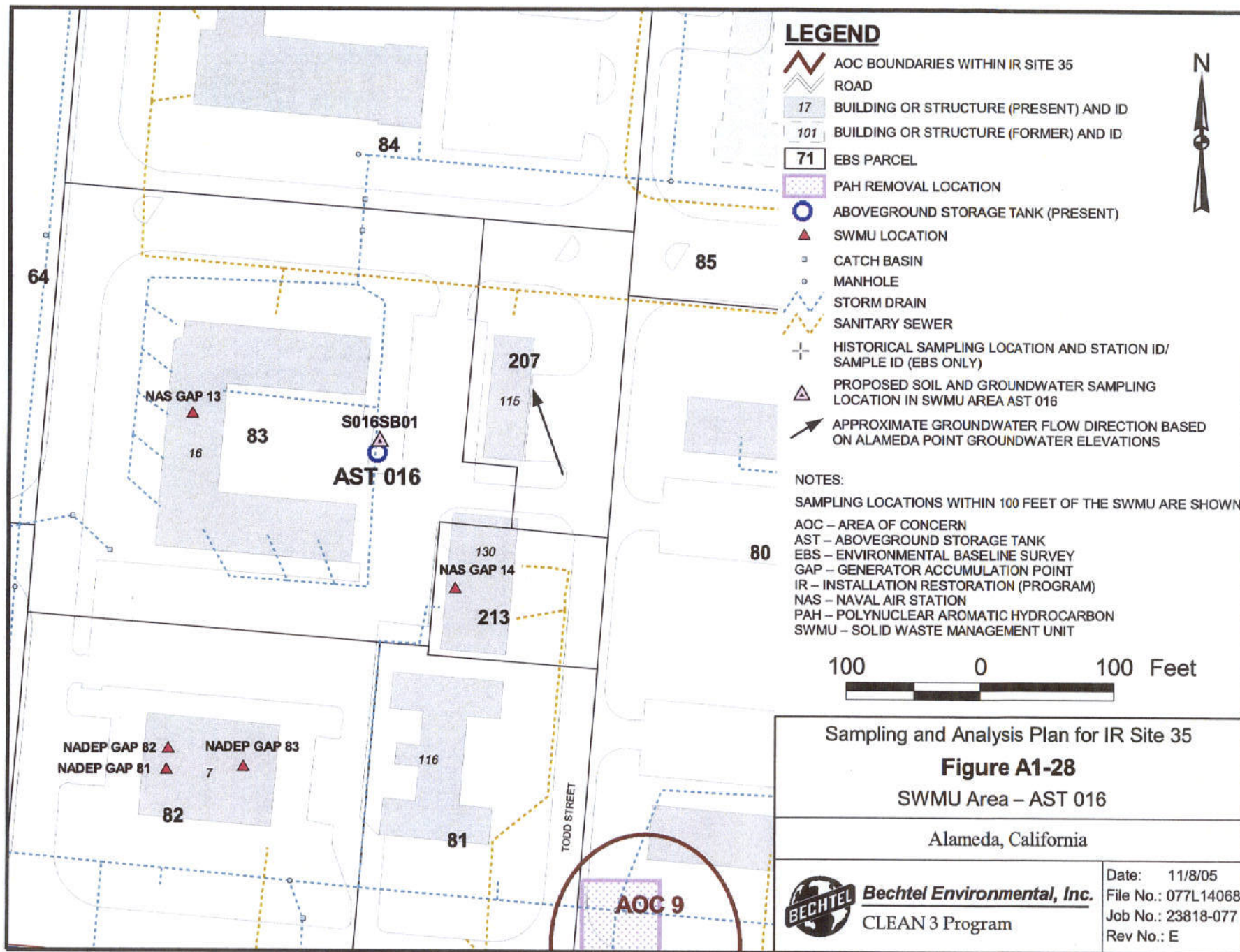
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Job No.: 23818-077
Rev No.: G

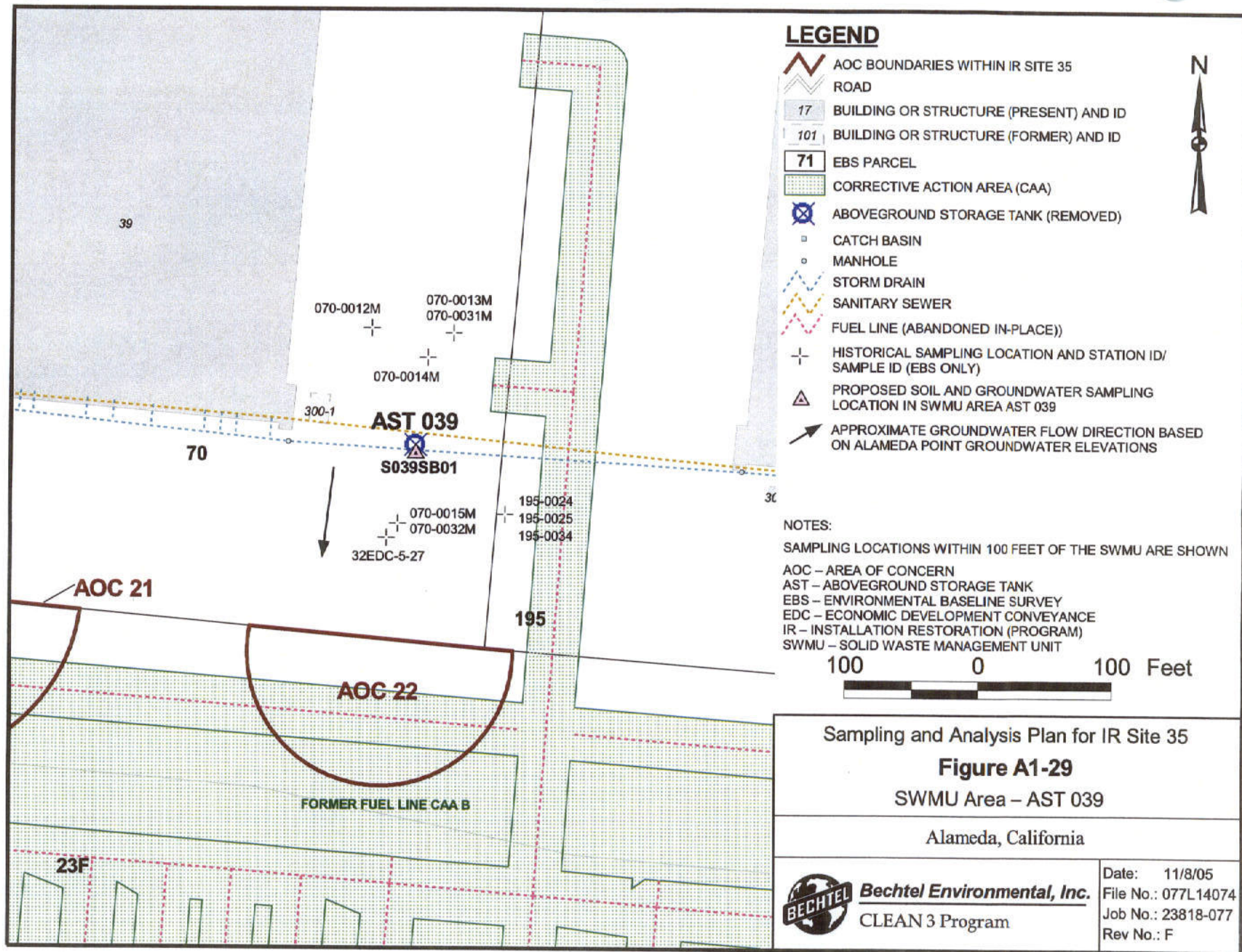


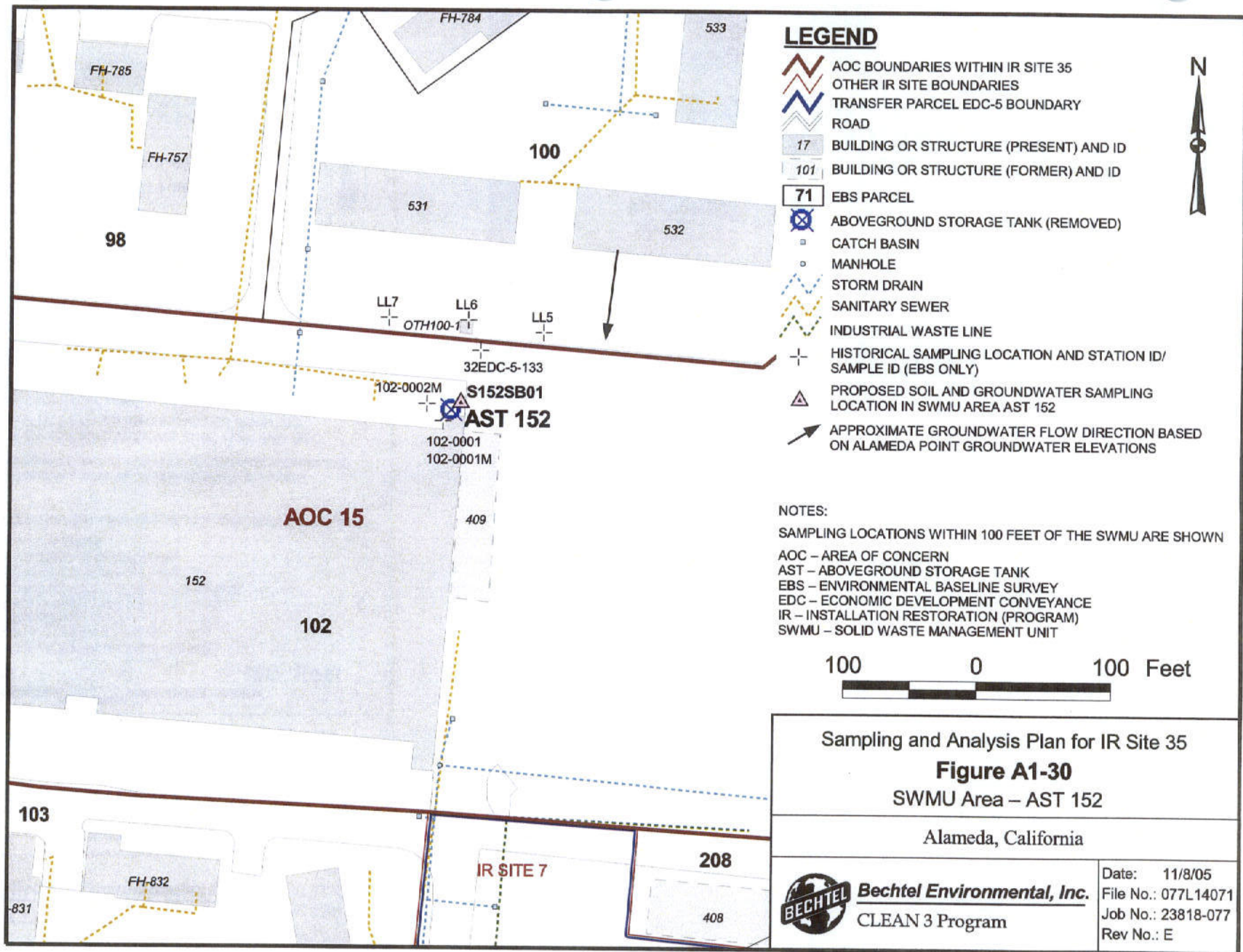


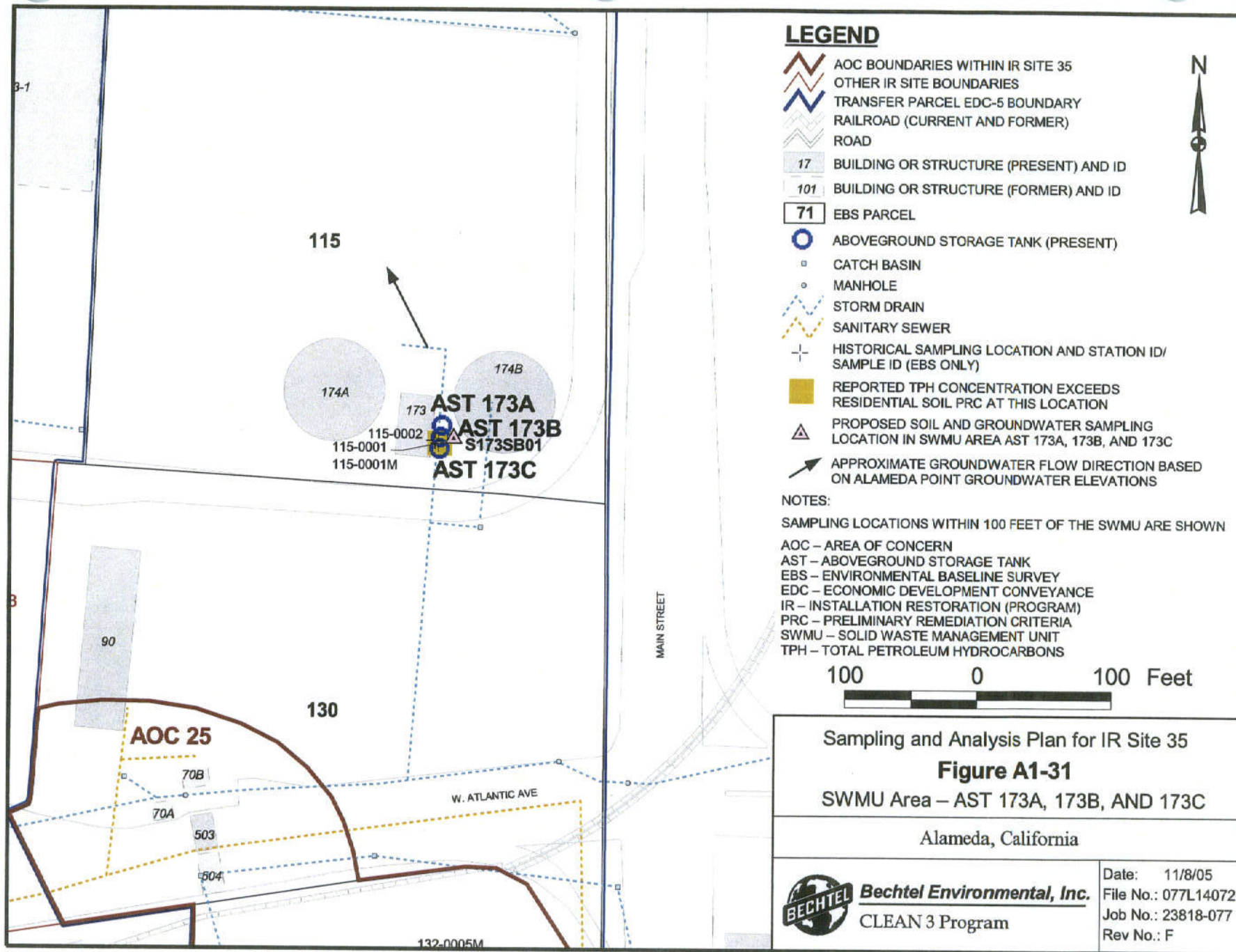












LEGEND

- AOC BOUNDARIES WITHIN IR SITE 35
- OTHER IR SITE BOUNDARIES
- TRANSFER PARCEL EDC-5 BOUNDARY
- RAILROAD (CURRENT AND FORMER)
- ROAD
- 17 BUILDING OR STRUCTURE (PRESENT) AND ID
- 101 BUILDING OR STRUCTURE (FORMER) AND ID
- 71 EBS PARCEL
- ABOVEGROUND STORAGE TANK (PRESENT)
- CATCH BASIN
- MANHOLE
- STORM DRAIN
- SANITARY SEWER
- HISTORICAL SAMPLING LOCATION AND STATION ID/ SAMPLE ID (EBS ONLY)
- REPORTED TPH CONCENTRATION EXCEEDS RESIDENTIAL SOIL PRC AT THIS LOCATION
- PROPOSED SOIL AND GROUNDWATER SAMPLING LOCATION IN SWMU AREA AST 173A, 173B, AND 173C
- APPROXIMATE GROUNDWATER FLOW DIRECTION BASED ON ALAMEDA POINT GROUNDWATER ELEVATIONS

NOTES:

SAMPLING LOCATIONS WITHIN 100 FEET OF THE SWMU ARE SHOWN

AOC - AREA OF CONCERN
 AST - ABOVEGROUND STORAGE TANK
 EBS - ENVIRONMENTAL BASELINE SURVEY
 EDC - ECONOMIC DEVELOPMENT CONVEYANCE
 IR - INSTALLATION RESTORATION (PROGRAM)
 PRC - PRELIMINARY REMEDIATION CRITERIA
 SWMU - SOLID WASTE MANAGEMENT UNIT
 TPH - TOTAL PETROLEUM HYDROCARBONS

100 0 100 Feet

Sampling and Analysis Plan for IR Site 35
Figure A1-31
 SWMU Area - AST 173A, 173B, AND 173C

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